

But intensity of heat is often of more consequence than quantity, and intensity depends very much on the density of the fuel. Thus, charcoal never produces so high a heat as coke, and in this respect the density of coke and common coke are of great importance. These comparisons are of great importance in the quality of iron, where the fuel is used for reducing the metal from its ore, or for working iron by fire generally, or when it is used under iron boilers for generating steam.

The above analysis was made on turf from Lancashire, but, from other experiments, I find the turf from many of the bogs in Ireland exceeding it in purity, and containing a much smaller proportion of incombustible matter.

In considering the foregoing report and analysis, the great density of both the peat and peat coke, through produced from the lighter portion of the surface, is remarkable, the compressed peat being 30 per cent. denser than oak wood, and double that of the lighter woods, while the coke is double the density of charcoal, and on a par with coal coke.

I may here add, that this density, which is so valuable where intensity of heat is an object, may be still further increased, and with little additional expense. This being the first time that the results of the litharge test, as applied to turf coke, has been communicated in this country, the value of which Herlihy, in his elaborate and admirable essay on combustible bodies, has fully established, I may be permitted to say, that its accuracy, and the small amount of practical error to which the process is liable, as shown by Mr. Everitt, given it a high claim to our attention, although to persons not familiar with the nature of chemical tests it may not be so self-evident. We have seen, that the extraordinary attraction which carbon has for oxygen, and the power which it thereby exercises of decolorizing metallic oxides, renders the litharge test the most suitable for determining the absolute purity and calorific powers of the various coals, at least on a small scale, the carbon, under a high temperature, uniting with the oxygen in proportion to its calorific powers, while the lead, being thus deprived of that which is essential to its state of oxide, is precipitated in its pure metallic form, the relative weights so thrown down representing the true combustible values of the several coals.

We know that many foreign substances enter into the composition of coal and coke, and exercise a very injurious influence over iron and steel in the furnace and forge. In this respect the importance of the peat coke becomes apparent; iron is not only sooner brought by it to a welding heat, but it is found to work softer, and with less of that scaling which is so injurious, particularly in the operation of welding.

These facts I have proved, both in the furnace where large boiler plates are heated and in the operations of the forge, where even the worst iron was improved in quality. It is not an unimportant consideration, that peat coke may thus be produced from that portion of the bog which has ever been rejected as a domestic fuel, when a denser kind is to be obtained. Again, that it is precisely that description of turf which most abounds in Ireland, and in most of the large bog districts has hitherto been regarded as an absolute incombustible, alike unfit for fuel and for conversion to agricultural purposes. This arises from its extreme porousness and levity, its being so far removed from that decomposition which is essential to the vegetative functions of all soils, and also to its susceptibility of the extremes of excessive moisture and excessive drought—overcharged in wet seasons, and amounting to a mere caput mortuum in dry ones.

SPECIFICATIONS OF RECENT PATENTS.

(From the *Inventors' Advocate*.)

Domestic Frick Albert, L.L.D., manufacturing chemist, Cadishead, near Manchester, for an improved or new combination of materials and processes in the manufacture of fuel, Aug. 1.—*Claim*.—The new combination of materials and processes herein described for the manufacture of fuel.

The fuel is composed of five parts of bituminous schist in a ground state, two and a half parts of aluminum clay perfectly dried and mixed up with 1-10th of a part of mineral oil, five parts of ground coal, and two and a half parts of vegetable gelatine or tar, evaporated with two and a half parts of mineral gelatine or tar. The vegetable and mineral gelatine are heated in a pan to a proper consistency, and then the other ingredients first mixed together are thrown into them, and worked up together so as to form a homogeneous paste, which is then conveyed to a hole cut in the ground near the pan, so as to form a cake or flag without the necessity of either a press or a mould.

Richard Jenkins, machinist, Hayle, Cornwall, for certain improvements in valves for hydraulic machines, July 26.—*Claim*.—The use of the additional valves constructed as described, so that they may serve also as seats, being hung in the ordinary manner by joints, but without any cross bars, guides, or spindles in the valves or seating to obstruct the entrance of the water; also the mode of combining a series of valves.

These improvements consist in the addition of two or more valves to the single valve and seating commonly used for hydraulic machines, so that every valve except the uppermost may serve as a seating to that immediately over it. The valves are hung by joints one above another, the uppermost being the smallest. By this means the lift will be less than usual, in consequence of each valve admitting a quantity of water proportionate to its size.

Nathan Waddington, engineer, Holme, Lancashire, for certain improvements in the construction of steam-boilers, and furnaces for heating the same, July 26.—*Claim first*.—The construction of the steam-boilers, when formed throughout their entire length of a combination of circular parts and stay-plates, or when only a portion of their length consists of the combination of circular parts, and the remainder of cylinders, in either case accessible in all their parts by one man-hole. Also the cylinders which intersect each other in the flue, when they are used in combination, and form part of the steam-boilers used for marine or inland navigation.

Claim second.—As regards the furnaces for heating the boilers, the combination and arrangement of those parts on which the fuel is supported and submitted to the coking or roasting action of the furnace.

Claim third.—The arrangement of the furnace doors and the grate bars, when they are combined with the coking and roasting parts, but not otherwise.

The mode of constructing stationary steam-boilers, and their furnaces, is as follows:—The boiler for about half its length from the front end is made in the form of portions of circles, consisting of two large ones connected together by a smaller one, the form of the boiler being maintained by stay-plates, which are attached to the larger portions on each side of the smaller one, spaces being left between the stay-plates to allow a free passage for the water and steam. At the end of this half of the boiler, the smaller portion of a circle and the stay-plates terminate, and the two larger portions of circles assume the form of two cylinders, and gradually descending a little, then proceed horizontally for a short distance. These cylinders are enclosed in a flue, which causes the heated current from the furnace to pass around and between the cylinders, against which it is also caused to impinge by bridges or cheeks built in the flue. The supply water is introduced by a feed-pipe into the lowest part of the cylinders, so that the boiler is filled with water at its lower extremities, whilst the upper part is occupied by water and steam in nearly equal proportions. Access is had to all parts of the boiler through a man-hole in front of it.

The furnace is placed under the front end of the boiler, and on each side of the flue-grate are dead-plates, on which the supply of coal to the furnace is received from above, through openings called feeding mouths, which are closed by the fuel when the furnace is in full operation, but are provided with doors for closing them when that is not the case. The coking and roasting of the fuel and lighting the fire is performed through a door in front of the furnace, which is opened by sliding downwards, and is for that purpose suspended from a lever, being balanced by a counter-balance weight. The fire bars descend towards the centre of the width of the furnace, in order that the coals may be raked with greater facility from the dead-plates to the centre of the fire. The coals upon the dead-plates are roasted or coked by the heat of the furnace, and their gases liberated, and these gases in their passage to the flue pass over the fuel in the centre of the furnace which is in a complete state of combustion, and are consumed.

The boiler for marine and inland navigation is composed of a number of portions of circles, and is divided in the interior by a number of plates, by which the mass of water is prevented from rushing to the sides or ends of the boiler, when the vessel pitches, or rolls to and fro on the water. In the lower part of the head end of the boiler a number of small cylinders are attached, their lower ends which are in the flue being closed, and their upper ends opening into the boiler, so as to allow a free communication between the water contained in them and that in the boiler; they are placed in oblique positions, and intersect each other, so as to obstruct as much of the heat contained in the flue as possible. The boiler and its furnace, which is similar to that above described, rest upon a casing filled with water, in order to prevent accidents from fire.

James Johnson, Esq., Wilton, near, Herefordshire, for improvements in obtaining motive power, Aug. 8.—*The invention* consists in the working of an engine by the explosive and condensative properties of certain proportions of oxygen and hydrogen gases.

The following is the mode of working the engine, which may be of any suitable construction, supposing that the piston is at the bottom of the cylinder in starting:—A quantity of oxygen and hydrogen gases, in the proportion of one part of oxygen to two parts of hydrogen, is admitted into the cylinder below the piston, the valve which admitted the gases is then closed, and the gases are exploded by any of the ordinary methods used for exploding them. By this explosion the piston is driven to the top of the cylinder, and as soon as the expansion of the gases has ceased, a vacuum is formed below the piston. This is caused by the two gases uniting and forming water, and the space below the piston which was before filled with the expanding gases is thus made a void, with the exception of a very small quantity of water.

The piston is now driven down to the bottom of the cylinder, by the gases being admitted and exploded as before, producing a vacuum as above stated. This explosion thus forces the piston into the vacuum formed by the previous explosion, and the engine will continue to work as long as the gases are admitted and exploded alternately above and below the piston. The patentee does not confine himself to any particular form of engine.

Claim.—The working of an engine by the joint action of the explosive and condensative properties which certain proportions of oxygen and hydrogen gases possess when exploded together.

LAW INTELLIGENCE.

LAW OF PARTNERSHIP—SNOWDON SLATE COMPANY.

NORTHERN CIRCUIT, LIVERPOOL—AUG. 17.

WILLIAMS AND OTHERS v. BAILEY AND OTHERS.—In this action the plaintiffs sought to recover the amount of a bill of exchange, which it was alleged they had discounted for the defendants.

Mr. Crosswell and Mr. Martin conducted the case of the plaintiffs, and Mr. Daines and Mr. Compston that of Mr. Bailey and several of the defendants, while Mr. Wortley appeared for one of them.

The plaintiffs, it appears, are bankers at Carnarvon, in Wales, and the defendants are partners in a company called the Snowdon Slate Company, the affairs of which were conducted by a Mr. Davis, as managing director. In January, 1840, Davis applied to a Mr. Potter to accept a bill for him, stating that he wanted money to pay the arrears of the quarrymen's wages; this Potter agreed to do, on condition that he should be furnished with 15,000 Counties' shares, and a bill was accordingly drawn by Davis upon Potter, dated January 7, 1840, for 80*l.*, payable at six months after date. Davis had for twenty-five years had a banking account at the plaintiffs' bank, and took the bill to them to be discounted, stating that he wanted the money for the Slate Company. The manager of the bank observed that the bill was drawn in his name only, and not as for the company; upon which Davis said he could alter that, and wrote on the bill "per procuratione of the Snowdon Slate Company." It was then discounted, and the money appropriated to the payment of the quarrymen; and it was now sought to fix the defendants with this account. The partnership of the defendants having been proved, it was objected on their behalf that this was a transaction which Davis had entered into without their knowledge or authority, and that they were not liable—first, on the ground that the bill had been essentially altered since it was originally drawn without any consent of the acceptor; and, secondly, because the company not being a trading company, but formed only for selling the produce of their mine, no partner could bind the others by the acceptance of bills without an express authority for that purpose, which had not been proved, nor had it been pretended. Davis died only a short time ago, and could not, therefore, be produced to throw any light upon the subject.

After considerable argument, the learned Judge directed a nonsuit to be entered, reserving leave for the plaintiff to move to enter a verdict for the amount claimed, if the court above should think that the case ought to have gone to the jury.

ON THE STRATIFIED AND UNSTRATIFIED VOLCANIC PRODUCTS IN THE NEIGHBOURHOOD OF PLYMOUTH.

BY THE REV. D. WILLIAMS.

(From the proceedings of the British Association.)

Mr. WILLIAMS stated, that the prevalent association over the different regions of the earth, of granite, gneiss, greenstone, porphyries, mica, talc, chlorite, and clay-slate, had for some time past induced him to suspect that such common assemblage was not without its significance—recent observations in Devon and Cornwall had convinced him, that there existed an intelligible relationship in the community of their origin—viz., that they were all volcanic products. He would instance, first, the granite veins in the bed of the Erme river, above Ivy bridge, of which he exhibited a horizontal section. He at first regarded them as veins which had been injected into the yielding joints and fissures of the fine Jasper grit rock; closer inspection showed him also certain very delicate threads of the same flesh-coloured granite, emanating from the larger joints, but ranging after the planes of deposition of the grit; and the Jasper rock was no more dislocated there than elsewhere. Higher up the river bed he came to what appeared a hard junction between the grit and the granite—the former was in a highly metamorphic condition, but its upper surface showed frequently that its lining of deposition had not been obliterated. Specimens of the altered rock, obtained from the immediate confines of the hard junction line, showed no mineral transition between the granite and the altered grit. He had observed below, that while the grit showed no evidence whatever of having been acted on by any unusual violence, most of the granite veins ranged in the direction of its normal joints. Almost the first specimen he obtained from one of these joints (upwards of four feet above the granite in mass), showed its walls to be perfectly granitic, the granitic matter showing out laterally in the most delicate penillings, while nearly all the other joints afforded the same evidence of conversion, in a greater or less degree. From these facts Mr. Williams felt constrained to deny that the granite had ever been forcibly injected, and to maintain that the entire phenomena might be better explained by tranquil fusion and conversion. He contended that the pre-existing sedimentary rock had been reduced and converted into granite, by intense heat from within, traversing the joint lines in their several directions, and radiating from them laterally among the laminae of deposition, apparently indicating, that wherever the temperature amounted to its point of fusion, there the rock would be reduced to the same condition with the incandescent mass below. With regard to the evans or greenstones, and the so-called clay-slate or killas, he considered that abundant evidence existed in Devon and Cornwall to show, they also were volcanic products, the former in its usual amorphous type, the latter in a stratified condition. On the shore of the Padstow estuary, west of Wadebridge, fourteen of these evans might be observed at varying intervals, each one underlain and overlaid by volcanic breccia, grit, ash, and clay-slate—these greenstones all observed the same angle of dip, and precisely the same strike as the killas above and below them; indeed several of them are dislocated on the opposite side of the river, in the precise places which the direction of strike would have indicated, and there also tilted up at the same angle with the clay-slates above and below. This line of low cliff extends about a mile, the slates and evans having a permanent southern dip, with one undulating exception. There, fourteen submarine lava streams occupy perfectly distinct levels in the vertical scale, each one representing its own period of ocean time, during a greater or less interval of time, and each one apparently preceded or accompanied by ejected fragmentary matter—by grit, ashes, and mud, the greenstones being very commonly based upon a grit or breccia, at other times upon an ash or slate, each of them appearing to pass insensibly into the other. Mr. Williams (particularly directed attention to the coast round Saltash, in the immediate vicinity of Plymouth, or from Redding Point to the great mass of porphyry near the fishing houses, which was one uninterrupted series of varieties of volcanic ash, often passing into clay-slate, interstratified among the thick red sandstone beds seen on the east and west cliffs of the sound. The lower beds of this sandstone Mr. Williams observed to be traversed by four north and south dykes, which cut the beds at right angles, and filled with the same rejectamenta that he had observed to constitute the partings between the sandstone beds; these he supposes may have been the ventricles through which ashes were blown out, as it was an interesting fact, that these ash dykes did not traverse the more southern beds, but were overlaid and concealed by them.

Prof. Sedgwick observed, that he concurred with that part of Mr. Williams's paper which referred most of the slate rocks to a partly volcanic origin; volcanic ash will necessarily constitute part of the beds whose formation takes place contemporaneously—so that, in some instances, slates may be the derivatives of volcanic action. In Cumberland he had been led to regard great beds of compact felspathic porphyries as good leaders of slate, although not always of good white. Granite veins were frequently met with in slate rocks highly metamorphic; it is a common occurrence to find extremely indurated slaty rocks disposed round granite masses. In the neighbourhood of Dartmoor these rocks are of various ages, but they are all altered, and assume one general character when in contact with the granite, a change which is superinduced after all have been deposited. The veins cut through amongst the altered slates and split them up—the action is purely mechanical. Of their positive injection there can be no doubt; the correspondence between the sides of a vein is exact, marks found on one side agreeing with those on the other. During these operations, the mass is in a state of intense incandescence, and is ending, joints will be formed affecting both granite and slate; and Prof. Sedgwick attributes the filaments of granite penetrating the slates in the way described by the paper to volcanic action, sublimating the granite into the minute cracks in the slate; he, therefore, considers them formed after the granite veins. He wished to confine the word "evans" to those quartziferous porphyries, more granitic in their structure than the greenstones, which split up both granite and slate, like those of the Harze; they were few in Cornwall compared to those of Cumberland, and small compared to those of North Wales. Again, with respect to their mode of injection, it takes place while the strata are perpendicular, they will split the rocks along the lines of stratification, and appear as if bedded with them, following all their inclinations. At Weirong, on the banks of the Looe, the schists, which is a derivative trap-rock, abounds with opaque remains. The passage of slaty structure into highly crystalline, was well shown at Looe, in the Snowdonian district of North Wales, where talcous slates gradually pass into extremely fine chloritic slates, and the latter into a compact quartzose porphyry. The talc is some of the slates mentioned by Mr. Williams, he considered, due to the decomposition of iron pyrites rather than to talcification.

Mr. De LA BÈCHE stated it to be a common occurrence to find joints of rocks filled with granitic matter. At St. Michael's Mount, the faults are

filled with a variety of substances. The elements of granite, mica, quartz, and felspar, might fill veins in almost any proportion, and in the north of Cornwall, carbonate of lime occurs with the quartz and felspar, so that where crystallization has taken place, a granite is formed composed of felspar, quartz, and carbonate of lime. In consequence of Mr. Williams's idea of the volcanic origin of slate rocks, he stated, that the beds referred to at Tavistock and Milton Abbot, had been shown by chemical analysis to possess the same mineral constitution as the adjacent trap-rocks.

DUDEY AND MIDLAND GEOLOGICAL SOCIETY.

The *Midland Counties Herald* of Thursday last, notices the formation of a society under the above title, and, from the long list of distinguished names attached to the prospectus, the society is commencing its operations under the most favourable auspices. Some delay has occurred in procuring a building suitable to the objects of the society, but we understand that exceedingly eligible premises have at length been obtained, situated in the centre of the town of Dudley, and comprising rooms fitted for a museum, a lecture room, a library, and committee rooms. We refer with the greater pleasure to the formation of this society, because it has long been felt that there are few localities where there exist greater facilities for the formation of a valuable museum, and indeed for the general prosecution of geological researches. A museum, which should contain a complete collection of the various fossils of the Staffordshire coal-field, and of the series of rocks known as belonging to the Silurian System, would, even if confined to those already known and described, be of great and general interest, as well as of much utility to the practical miner; but it will assume a much greater importance when it becomes the repository of many new and at present undescribed fossil remains, such as are every day being added to the museums of private collectors, but which, from their being confined to such private collections, are almost, if not entirely, unknown to the scientific world. The central situation of Dudley will enable the society to obtain contributions from many distant geological formations—from the Silurian rocks of Dudley, Sedgley, Walsall, Ludlow, &c.—from the coal fields of North and South Staffordshire, Shropshire, and the Clee Hills—from the new red sandstone of Staffordshire, Worcestershire, Warwickshire, and Shropshire—and from the lias and coals of Gloucestershire and Somersetshire; but in addition to these advantages, it must be remembered that there is no spot which possesses greater facilities for the investigation of one of the most interesting problems of geology—the changes produced in the surface of the earth, as well as in the mineralogical structure and relative position of its strata, by volcanic agency—such as have caused the eruption and protrusion of trap rocks at different geological epochs. The basaltic hills of Rowley Regis, Netherton, and Hallow Hill, in the immediate neighbourhood of Dudley; of Pook Hill, and Birch Hill, near Walsall; and, indeed, the presence of beds of trap rock over so large a portion of the South Staffordshire coal-field, and under such a variety of circumstances, present opportunities for investigating the effects produced by the action of intense and long-continued heat on the structure of the earth, which can rarely be elsewhere equalled, especially when we recollect that the numerous ironworks in this district furnish at the same time equal means of illustrating and comparing the changes produced on such a grand scale by natural causes with those which are daily taking place, though of course in a much more limited manner, by the application of artificial heat to the different materials employed in the ironworks. With these facilities for forming an effective society, we cannot doubt that it will meet with success, and we congratulate those individuals who have been engaged in forming a similar society connected with the Birmingham Philosophical Institution on the prospect of their deriving much advantage from the zealous co-operation of the two societies, which, we understand, both are desirous of effecting.

ON THE ATOMIC WEIGHT OF IRON.

BY M. CAPITAINE.

If a piece of zinc be plunged into a solution of proto-chloride of iron, as neutral as possible, in a short time the zinc becomes powerfully magnetic; and if the immersion be continued long enough, a pappy mass is formed, which is iron. At the same time, bubbles of hydrogen are disengaged. By this process, it seems impossible to obtain iron free from zinc. To obtain it, it is necessary to solder to the zinc, a sheet of well cleaned copper, which must descend into the ferruginous liquid. This sheet is gradually covered with a lamellar layer of iron, which may easily be detached by heating the copper in different directions. The iron is of a bluish-white, and possesses metallic lustre, especially on the side next the copper; it is extremely friable. In order to dry it without altering it, I submitted it to a current of pure dry hydrogen, at a dull red heat; after this operation, the metallic plates acquired a very great tenacity. Regarding the iron as perfectly pure, I wished to use it for verifying the atomic weight of iron given by the most recent authors. I adopted two processes:—

1. Peroxidation by means of nitric acid, and the comparison between the weight of the metal employed, and that of the peroxide obtained.
2. The solution by means of dilute sulphuric acid in a graduated tube over mercury, and by measuring the hydrogen disengaged. (It is difficult thus to dissolve all the metal).

These two operations, and especially the first, which appeared to me capable of great accuracy, have always given a mean atomic weight of less than 339, and which, deduced from the best operations, is not far from 321. The atomic weight of zinc being greater than that of iron, we cannot attribute to its presence the difference which exists between the cypher which I obtained and that given in the most recent works. Iron thus obtained, acts with reagents in the same manner as ordinary iron; I should observe, however, that its peroxide appeared to me rather more fusible. I have communicated to the academy only the first part of this work, because I had observed in the reduction of the peroxide, certain peculiarities for which I have not had time to account. Such is the formation in the tube of a small quantity of a white volatile substance, which occurs only when the temperature is very high. The hydrogen was purified by passing through a very large flask filled with potash and chloride of calcium. — *Annales de Chimie et de Physique*.

GEOLOGICAL DISCOVERIES NEAR PARIS.—The great depth to which the ground has been thrown open in every direction in the immediate vicinity of Paris, for the fortifications, will have the advantage of making known the geological riches of the department of the Seine. Thus, in the lower part of the Bois de Boulogne, opposite Auteuil, ferruginous sand has been found which is as red as blood. Above Rueil and Murets beds of stone for building have been discovered of a remarkably hard quality, and which could be worked to great advantage.

CONVERSION OF IRON INTO PLUMBAGO BY SEA-WATER.—M. Deslongchamps has found lying near La Hague, where the naval battle was fought, some cannon balls, which although they do not appear externally to have undergone any change, yet have lost two-thirds of their weight, and may be cut with a knife like a black lead pencil; they contain no iron in the metallic state, and exert no influence on the magnetic needle.

THE ARTESIAN WELL OF GRENNELLE.—The artesian well of Grenelle, the abundant source of which was lately almost entirely choked up, suddenly rushed again last week, and the workmen who were working at the pipe received on their shoulders a real water avalanche of green sand and particles of clay and water; the opening of the well was cleared, and from that moment the water fell from a height of fifteen to twenty metres, with a stunning noise, which is heard as far as the great avenue of Breteuil, situated at more than 100 metres from the orifice of the well. The well, since the spouting out of the water, presents a series of extremely curious phenomena. It is thought that the earthquake which was felt a few days ago has precipitated to the bottom the roof of the argillaceous bed which formed a vault under the greensand, in the middle of which the reservoir of water is formed; and that the argillaceous soil, scarcely permeable, which is situated round the orifice of the first tube, may have by this means arrested the course of the water. In the present state of things it is difficult to form any accurate idea of the height to which the waters may ascend; the water sometimes spouts out to more than three metres above the buildings, which are fifteen metres high. As has been announced, 300 metres of lined copper pipe have been put down into the hole; M. Mulot did not at first project carrying the pipe lower than 300 metres, but, in accordance with the advice of MM. Arago and Humboldt, the pipe will be carried as low as the permeable bed of sand, which is 250 metres lower. This operation is attended with great difficulties; in order to effect it, it will perhaps be necessary to draw out the interior pipe.

ARTESIAN WELL AT HAGUENAU.—For some time past workmen have been engaged in boring an artesian well at Haguenau (Bas Rhin). A few days ago, after having gone to a depth of 290 metres (nearly 900 feet), the boring instrument entered a bed of salt strata, and immediately on withdrawing it, the water rose to the surface. Although mixed with the springs of fresh water met with in the course of the boring, the water at the surface was as salt as that of the sea. On being analysed, it was found to contain 25 grammes (nearly an English ounce) of salt per litre, or quart, with some traces of iron and bromine. The Municipal Council, on whose account the work has been performed, intend to line the well with a copper tube, so as to isolate the salt spring; when this shall have been done, the water will be much more saline than it is now. From the present state it is said to be superior to that of the baths of Carlsbad and Wiesbaden.

MINING CORRESPONDENCE.

ENGLISH MINES.

HELMHURST MINING COMPANY.

August 16.—I beg leave to inform you, that the lode in the 110 fathom level west is eight inches wide, composed of muddle and spar, and peach, with a small proportion of ore. In the 100 fathom level west the lode continues about sixteen inches wide, and worth 26d. per fathom. In this level, east of James's mine, on the south branch, no alteration. In the new mine, in the bottom of this level, and western slopes, in back of ditto, no lode has yet been taken down. The lode in the eastern slopes, in back of this level, is two feet wide, and worth about 50d. per fathom. The lode in the ninety fathom level west is six inches wide, and worth 7d. per fathom. The lode in the slopes, in back of this level, is one foot wide, and worth 10d. per fathom. The lode in the eighty fathom level, east of Wall's shaft, is one foot wide, composed of muddle, spar, and capel, with stones of ore. The lode in the slopes, in back of this level, is still about twenty inches wide, and worth 40d. per fathom. The lode in the seventy fathom level slopes is two feet wide, and worth 24d. per fathom. The Flap-jack lode, in the seventy fathom level, east of Wall's shaft, is still about three and a half feet wide, composed of muddle and spar, intermixed with copper ore—a kindly lode. The rise in the back of the eighty fathom level, against Hitchins's shaft, and the rise in the back of the sixty-two fathom level, against ditto, are still progressing favourably. The rise in the back of the sixty-two fathom level, against Bray's shaft, continues in moderate ground. The tribute pitches are without important alteration.

F. PHILLIPS.

REDMOOR CONSOLIDATED MINING COMPANY.

August 16.—At the engine-shaft the timber work is completed to the bottom, and the men are now engaged in cutting whim-plate for a sixty fathom level, which will occupy three months. The fifty fathom level, cross-cut south is still being prosecuted by six men; no alteration has been noticed during the past week; we have driven twenty-one fathoms from the shaft. At the forty fathom level, going south on the lead lode, the ground is favourable for driving, and congenial for lead ore; the lode is about eight inches wide, and ore throughout. Driving north, at the same level, the lode is from ten to twelve inches wide, producing good work for silver-lead ore, and showing altogether a kindly appearance. At the thirty fathom level, going south on the lead lode, we find it to be about six inches wide, saving work. At Harl-don, driving west on the lode, the ground is rather hard; lode about eight inches wide, composed of capel, spar, jack, and muddle. We notice but little variation in the appearance of the tribute pitches.

F. H. ROWE.

WEST WHEAL JEWEL MINING ASSOCIATION.

Aug. 16.—We expect to cut the north branch, at the seventy fathom level, in the course of the week. In the fifty-seven east, on the south branch, the lode is worth 5d. per fathom. The fifty-seven east, on the south branch, the lode is worth 5d. per fathom. The fifty-seven west, on this lode, is worth 5d. per fathom. In a mine sinking under the forty-two fathom level, on the south branch, the lode is worth 12d. per fathom. The deep adit west, on the south branch, is worth 7d. per fathom, and the rise in the back of this level is worth 10d. per fathom. The deep adit west, on the south lode, is worth 6d. per fathom. The south adit shaft is sinking under the fifty-seven fathom level in very favourable ground.

S. LEAN.

TREGILLON CONSOLS MINING COMPANY.

Aug. 14.—The bottom level at Good Fortune continues ore—the east end worth 3d. per fathom, and the west end worth 9d. per fathom. At Christ's the seventy east continues ore, the bottom of the end worth 5d. per fathom; this level west possesses a large lode, ore throughout, worth 4d. per fathom. In the sixty west the lode continues large, with a leader of ore fifteen inches wide, solid, worth 12d. per fathom. The fifty west is two and a half feet wide, all saving work, worth about 5d. per fathom.

W. SINGOCK.

TREGILLON MINING COMPANY.

Aug. 16.—I beg leave to inform you that we have just experienced a very favourable change in the lode at the forty fathom level east; in cutting into it from the side of the level, we discovered good yellow ore, eighteen inches wide, which will yield, according to present appearances, from a ton to a ton and a half per fathom, worth about 5d. per ton; we are still engaged in cutting through the lode, which we find to be very large and encouraging. Baker's shaft is now sunk below the thirty fathom level about six fathoms, which we are sinking with all possible speed, with eight men, in order to accomplish without delay the hoisting of this shaft to the forty fathom level, which is so desirable an object to perform; the lode in the said shaft is unproductive, and the ground rather hard. The lode in driving the thirty fathom level east is producing a small quantity of ore, and the ground favourable for driving; we expect to hole this level to the new mine, sunk below the twenty fathom level, in the course of a day or two. Our prospects in the other departments of the mine are looking favourable, and the tributors are in good spirits, and working well. Mr. Henwood has been with us to-day examining the mine, who, I have no doubt, will report to you fully and satisfactorily on all points.

JAMES NINNIS.

UNITED MILLS MINING COMPANY.

August 16.—Twenty Fathom Level.—In driving east at this level the lode is about 1 ft. 6 in. wide, producing some good stones of ore. Forty Fathom Level.—The lode in this end is four feet wide—2 ft. 6 in. of which is good ore. Thirty-six Fathom Level.—In the mine sinking east of Turton's shaft the lode is three feet wide—1 ft. 6 in. of ore of a fair quality. West of ditto the lode is three feet wide, coarse in quality. Forty Fathom Level.—The lode in this end is three feet wide—1 ft. 6 in. ore. Forty-six Fathom Level.—In driving east of Turton's the lode is 3 ft. 6 in. wide, producing but little ore. West of ditto but very little ground driven for the past week; the men have been engaged clearing the level. Fifty Fathom Level.—In driving east of Williams's shaft the lode is about four feet wide—two feet producing good ore. Slopes, west of Diagonal Shaft.—Two feet of the lode is good ore. Sixty Fathom Level.—At this level driving east of Williams's shaft the lode is four feet wide—1 ft. 6 in. on the south part good ore. West of ditto we can report no alteration since survey day. Diagonal Shaft.—No lode broken in James's or Diagonal shaft, during the past week. Williams's shaft.—No lode broken since our last.

S. H. FRANKS.

TREGILLON MINING COMPANY.

August 16.—The lode in the fifty fathom level west of engine-shaft is one foot wide, tribute ground. The lode in the fifty fathom level east of engine-shaft is eighteen inches wide, tribute ground. The rise in the back of the forty fathom level west of engine-shaft is holed, it has laid open tribute ground six fathoms, and good tribute ground opened four fathoms. The lode in the forty fathom level east of engine-shaft is nine inches wide, tribute ground. The lode in the thirty fathom level east of Williams's shaft is one foot wide, very good tribute ground. The lode in the twenty fathom level west of John's shaft, on John's lode, is six inches wide, good tribute ground. The lode in the twenty fathom level east of Williams's shaft is at present unproductive. The lode in the ten fathom level west of John's shaft, on a part of the Slide-park lode, is eighteen inches wide, good tribute ground. We have just intersected Tregillas's lode at the twenty fathom level west of John's shaft, it is about three feet wide, producing good stones of ore, much improved from the adit, and very kindly; we have begun to drive on it east. We have sampled this day 247 tons of ore.

H. WILLIAMS.

J. MORCOM.

MINING NOTICES.

[Under this head we purview collecting such paragraphs as may appear in the provincial and other journals, having reference to discoveries and improvements in mining operations at home and abroad. It is hardly necessary to observe, that we must not be considered to admit the correctness of the information conveyed, which, in too many instances, requires cautious investigation—the magazine expectations of parties in some instances, and the want of honesty in others, throwing a degree of responsibility on a journal in giving publicity to reports, which we do not intend taking upon ourselves.]

LEAD MINE IN AUSTRALIA.—We noticed last week the discovery in the Mount Lefly Range of a valuable vein of lead ore. We made a mistake, however, in stating the quantity of silver contained in the ore; the actual quantity found, on three different trials, is forty ounces from every ton of ore. The ore will yield rather more lead than we stated, as it has been ascertained to contain as much as 50 to 60 per cent. The lead containing the mine is now being surveyed, and the discoverers will be allowed to purchase the section. They have already commenced operations, we believe, and intend sending some 50 or 100 tons of ore by the *Cypsel*, provided they are able to get a sufficient quantity out in time. The advantages likely to result to the colony from so important a discovery are immense.—*Australasian Register*.

We have also heard a rumour during these two days, that other valuable minerals have been discovered in the mountains; among others, copper is said to exist.—*Ibid.*

SOUTH HUTTON COAL COMPANY.—We are happy to announce that the South Hutton Coal Company have conquered all difficulty, and succeeded in sinking through the sand at their extensive new "winning" of a colliery at Hutton, near Dalton-in-Ride. This brilliant achievement in the mining world was effected yesterday, when great rejoicings took place among the workmen, by whose exertions and zeal, guided by the ability and energy of Mr. Foster, the viewer and engineer, this great work has been accomplished.—*Darlington Advertiser*.

IRON.—The Staffordshire Ironmasters have reduced the price of iron 10s. per ton.—*Staffordshire Examiner*.

COLLIERIES-EXPLOSIONS.

TO THE EDITOR OF THE GATESHEAD OBSERVER.

SIR.—The state of the northern coal mines demands the most serious consideration. Witness the awful explosions at Wallsend, Huddon, Jarrow, Easing, &c., and now, the other day, at Willington, and Thornley, causing a horrible destruction of human life.

These calamities prove most clearly that the mode of ventilation is miserably defective. Now, I would ask, does the system that is pursued in the northern district accord with the philosophical knowledge of the present time? If it does not, why is it persisted in? If it is continued from ignorance, that is, indeed, most shameful; but if from obstinacy, it is still worse. Mr. Baddeley, the president of the Viewers' Society, and secretary to the coal trade, continually uses this system, which, he says, is the only method that we are acquainted with for preventing accidents in coal mines. It consists of a mechanical application of atmospheric air, to sweep away the inflammable gas as it is generated in the works, extending to a course of thirty miles; and also that the gas, when mixed with four parts of atmospheric air, becomes inflammable. Now, Sir, we know, from actual experiments, that hydrogen gas, when mixed with 1 to 13 parts of air, is highly explosive. I will, therefore, appeal to you to consider with what danger any system must be fraught that relies on so erroneous a calculation.

In the year 1806 a person waited on Mr. Branding with a proposal to do away entirely with explosions, and he gave the outline of his method to that gentleman and Mr. Baddeley. He descended into the pits, and fully investigated the evil. On his return he demonstrated the truth of his principle, and laid it down as an axiom; that where there is no dislocation of the coal measures there can be no confused hydrogen. This person was employed to put his system into operation in the neighbourhood of Dudley. The late Lord Dudley and Ward desired his agents to point out the most explosive of his mines. These mines were under the necessity of being artificially exploded from two to three times daily, even after all was done that could be done by endeavouring to dilute the gas. In twenty-three days he cleared three mines, and rendered them as harmless as mines over the dislocation are by nature. This person in 1815 was called to the district of the Tyne and Wear by the Society for Preventing Accidents in Coal Mines. He went down into Hebburn Colliery with Mr. Baddeley, lighted by a steel mill; and there he offered to clear it from gas in one month, but the offer was not accepted, though Mr. Baddeley had previously promised him a trial.

Now, Mr. Editor, I would ask why this person's system—a system that Sir H. Davy has pronounced to be scientifically sound—which the Society of Arts, in 1816, rewarded with their highest premium—which a Philosophical Society at Newcastle, in 1818, recommended to the coal trade—and of which the mine masters of Staffordshire, Worcestershire, and Shropshire, declared that it had exceeded their most sanguine expectations—why is this system not pursued in the North of England? Is human life to be thus continually sacrificed—property to an enormous amount almost daily destroyed and lost to the public—and are we to be told, as we were the other day, that no one is to blame? I boldly assert, that the fosterers of the system now used in the coal mines of Durham and Northumberland, if they persist in their obstinacy, will be both morally and legally guilty of the crime of aggravated manslaughter. If Mr. Baddeley and other directors of mines are ignorant of the system above alluded to, let them send for the inventor to instruct them, or allow him to clear the mines. When this is done (and it will be done immediately, if pride do not prevent it) we shall hear no more of imitations of poor colliers by explosions of hydrogen gas.

A LOOKER ON.

MINE ACCIDENTS.

Explosion at Hensell Colliery.—Early in the morning of Tuesday week, Joseph Routledge, a deputy overseer, proceeded into the engine pit at Hensell Colliery (situated about two miles from Thornley Colliery, the particulars of a dreadful occurrence at which we detailed in our last), according to his usual custom, for the purpose of examining whether it was in a proper state of ventilation previous to the second "shift" of men commencing work. Whilst in the far north district, and near the third board, he observed a heath, about ten yards from the face, was injured, by which the ventilation was rendered imperfect. It is supposed, by attempting to repair the heath, the inflammable gas had been brought upon the candle which he held in his hand, and by this means an explosion had taken place. He was instantaneously killed. Robert Forster, a tram waylayer, was just entering the district at the time of the explosion; he was severely hurt, and had not been found shortly after the accident, he would no doubt have lost his life by the after damp. At the time several men were working in the same district, but further north; four of these were, unfortunately, much hurt.

Platt-lane Coal Pits, Wigan.—On Saturday last as W. Oliver was ascending one of the coal pits belonging to Messrs. Thicknesse, situated near Platt-lane, Scholes, Wigan, his drill fell out of the basket when he had ascended about fifty yards, and stuck in the side of the pit. On his return for its recovery the basket was, unfortunately, capsize, and he was precipitated to the bottom and killed on the spot.

Back-lane Colliery.—On Saturday, the 14th inst., a collier employed at the Back-lane Colliery, Newton-moor, Cheshire, named Joseph Sykes, met with a fatal accident. He was ascending from the mine, when the chain on which he was seated, from some obstruction snapped asunder, and he was precipitated to the bottom of the shaft, a depth of forty yards. He was killed on the spot, his body being shockingly mutilated.

Willeslow-road Colliery.—On Tuesday last a long investigation took place at the Giffard's Arms Inn, Wolverhampton, into the circumstances attending the death of three persons named J. Jones, J. Mason, and W. Richards, miners, and whose untimely end there is too much reason to fear has been occasioned by an act of the most dastardly description. The deceased were employed at the Willeslow-road Colliery, belonging to Mr. G. Jones, and about six o'clock on Thursday morning last they, with a man named Haynes, got into a water-barrel to go down the pit to work; they had got about 145 yards down the shaft when the pit chain commenced running; the barrel fell into the sump, by which Richards was drowned and Jones and Mason were instantly killed by the falling of the chain. Jones's leg was broke, and he was also badly bruised; the top of Mason's skull was completely knocked off. The chain, which was about three tons weight, also struck Haynes, but, happily, without very serious injury. To those acquainted with pit work, the escape of any one of the men, under such circumstances, appears almost miraculous. The chain, which was a new one, had been properly fastened to the drum-barrel only the day before, and no doubt exists that it was unfettered by some wretch with a view to effect mischief. The plan has ended in the cruel murder of three unoffending men. Mr. Jones most creditably, and with great promptitude, issued handbills offering a reward of 500. on the conviction of the offender or offenders, who, it is to be hoped, will not long escape that punishment which such diabolical conduct deserves.

Wheal Bonwidden Mine.—On Tuesday, the 3d inst., a young man, named John Penlanas, was at work in Wheal Bonwidden Mine, a large scale of ground fell on him, and buried him, until the men went to green and fetched a hand-screw to remove a large rock which was on him. The man, however, did not receive so much injury as was expected, and is at present in a fair way of recovery.

Royal Pothenor Consols Mine.—On Thursday, the 5th inst., a slight accident occurred at the Royal Pothenor Consols Mine, by the falling of a large rock from the back of a pitch, in which two men, Hodman and Rowe, were working at the time. The first received a severe cut on the head and across the back of his hand, and the second was struck on the back part of the body. Both of them, we learn, are doing well.

Craigleith Quarry.—On Monday one of the workmen named Connolly while employed in discharging a piece of rock in an upper part of Craigleith Quarry, unfortunately fell along with the mass he had loosened, and was precipitated below, a height of forty feet, and received such severe injuries as shortly to occasion his death.

ELECTRICITY.—J. Goodman, Esq., M.R.C.S.L., in a continuation of his lectures on electricity at the Mechanics' Mutual Improvement Society, Manchester, referred to in our last, exhibited the decomposition of water by frictional electricity. The lecturer showed that the decomposition effected by shocks with the poles of Dr. Wallaston, was not identical with voltaic decomposition, inasmuch as oxygen and hydrogen were given off from each pole. He had, in a variety of experiments, by preventing entirely any break in the circuit, and suppressing, as much as possible, the formation of sparks on the surface of the cylinder, been enabled to produce hydrogen and oxygen in almost a state of purity; and by the electro-polarizing machine, exhibited to the audience, he had produced apparently pure hydrogen from the negative pole, so much so, indeed, that the passage of an electric spark through the gas, did not diminish its quantity at all; and afterwards, when mixed with atmospheric air, a large amount of the gas was converted into water by the spark. Mr. Goodman also exhibited very beautifully the development of negative electricity by the vaporization of water on red-hot iron, and related many other methods by which bodies are thrown into an electrical condition. The process of electrolysis, or the method by which perfect impressions of medals, coins, engravings on metal, and other matters, may be produced at very little trouble and cost, was also exhibited, and gave great satisfaction to the numerous auditory. The lecture was concluded, after a short description of electro-magnetism, and of some of the most useful voltaic combinations, in which the theories of voltaic action were introduced by the exhibition of the ignition of charcoal, metals, &c., and, lastly, by the decomposition of water by the voltaic battery, and the re-combination of its elements by the passage of an electric spark.

NEW PROCESS FOR THE PREVENTION OF EXPLOSION OF FIRE DAMP IN COAL-PITS.

(FROM A CORRESPONDENT.)

It has been found by experience, that Sir H. Davy's safety lamp, though in many respects an invaluable discovery, has failed in proving a preventive to the explosion of fire-damp in coal-pits; and the frequent recurrence of accidents in the mining districts, evince the melancholy truth, that the precautions hitherto devised are incomplete. I venture, therefore, to propose a new process for abating an evil so fatal to human life, which is at least worthy of trial. It is well known, that fire-damp explodes on ignition by an electric spark; and on this principle it is proposed, that an experiment be made with an apparatus consisting of Professor Daniell's voltaic battery and electrical wires, for the purpose of firing the gallery of a mine charged with an explosive mixture. By means of this ingenious and scientific contrivance, an explosion of fire-damp can at all times be effected with perfect safety, whenever the gas is evolved in sufficient quantities to generate this destructive element; and as the wires can be conveyed to the remotest chamber of the mine at a trifling cost, the experiment may be repeated with great facility by the aid of a powerful battery, in any place where it indicates its appearance, or creates a suspicion of danger. The actual presence, quantity, and position of the fire-damp, can always be ascertained with precision and certainty, through the agency of the safety lamp; but care must be taken that the carbonic acid and acote remaining in the mine after the inflammation, be got rid of, either by decomposition, absorption, or ventilation, before the workmen resume their labours. This formidable and treacherous enemy will thus be effectually and instantaneously annihilated, that otherwise could be but slowly, partially, and progressively consumed, combined with the advantage, that the health of the miners will cease to be impaired from respiration in a foul atmosphere.

ON THE CIRCUMSTANCES UNDER WHICH THE EXPLOSIONS OF STEAM-BOILERS GENERALLY OCCUR, AND ON THE MEANS OF PREVENTING THEM.

BY DR. SCHAFFERDIL, OF MUNICH, ASSOC. INST. G.E.

[Read at the Institution of Civil Engineers.]

In this communication it is assumed, that perhaps not one-tenth of the recorded explosions of steam-boilers can be correctly attributed to the overloading of the safety valve, or to the accumulation of too great a pressure of steam in the boiler. The author alludes to the degree of pressure which hollow vessels, even of glass, are capable of sustaining, if the pressure be applied gradually. He found, in repeating the experiments of Caignard de la Tour, subjecting glass tubes of one or two inches in length, one-fourth filled with water, hermetically sealed, and immersed in a bath of melted silver, that they apparently sustained the immense pressure of 400 atmospheres, without bursting; but if the end of an iron rod was slightly pressed against the extremity of the tube, and the rod caused to vibrate longitudinally by rubbing it with a leather glove covered with resin, the tube was invariably shattered to pieces.

Hence he concludes, that something more than the simple excess of pressure of steam in the boiler is necessary to cause an explosion, and that a slight vibratory motion alone, communicated suddenly, or at intervals, to the boiler itself, might cause an explosion. From the circumstances of safety valves having been generally found inefficient, he concludes that a force has operated at the instant it was generated in tearing the bottom or sides of the boiler, before it could act upon the safety valve.

From the sudden effect of this force, explosions have been ascribed to the presence of hydrogen, generated by the decomposition of water; but independently of the difficulty of generating a large quantity of hydrogen in such a manner, it could neither burn nor explode without the presence of a certain quantity of free oxygen, or atmospheric air; and such an explosive mixture would not take fire, even if mixed with 0.7 of its own volume of steam.

The ordinary mode of converting water into steam is by successively adding small portions of caloric to a relatively large body of liquid; but if the operation was reversed, and all the heat imparted to a given quantity of water in one unit of time, an explosive force would be developed at the same moment. For example, if a bar of iron be heated until it is coated with liquid slag, and is then laid upon a globe of water on an anvil, and struck with a hammer, the liquid slag communicates its caloric instantly to the water, becoming solid at the same time that the water is converted into vapour with a loud report. A similar occurrence may take place in a steam-boiler when a quantity of water is thrown into contact with an overheated plate, either by a motion of the vessel, or from a portion of the incrustation formed on the bottom or sides becoming loosened. A sudden opening of the safety valve may, under certain circumstances, prove dangerous or even any rapid increase of heat which would cause a violent excess of ebullition in the water. An examination is then entered into of the respective powers of water and of steam, to transmit undulatory motion, and of their compressibility. According to Laplace, the contracting power of steam at four atmospheres and 294 1/2° Far. is 1041.34511 feet per second, and that of water 6036.95 feet. The ratio of these different velocities is therefore as 1:4.5.

In cases of a sudden explosive development of steam, the principal action is directed against the bottom or the sides of the boiler, whence spreading itself through the water, it is finally transmitted through the steam to the safety valve; a wave created by an explosion, even at the surface of the water, would reach the bottom or the sides of the boiler 44 times sooner than it would affect the top of the steam chamber; but if it took place at the bottom, the time for the explosive wave to reach the safety valve would be the sum instead of the difference of both velocities. Although these relative periods of time may be considered as infinitely small, it is contended that there is sufficient delay (counting from the moment at which the plates begin to yield) to cause the rupture of the material which would otherwise have yielded by its own elasticity had the time been greater, as all communication of motion is dependent only on time.

To illustrate the effect of the sudden development of an explosive force upon the plates of a boiler, the author gives the results of a series of experiments made by him upon iron wires, for the purpose of ascertaining the amount of elongation which took place before yielding under the sudden application of a given weight. The result was, that a wire which had resisted a tension of 33 cwt. when gradually applied, broke invariably, without any elongation, when the same force was suddenly applied by a falling body.

Similar experiments with railway bars showed that fibrous iron, which supported a gradual tension, broke by the sudden application of the same force, while close-grained iron, which was incapable of resisting the gradual strain, broke perfectly well that of sudden impact. These facts are worthy of consideration in the selection of iron for boiler plates, where the sudden action of the rending force is to be guarded against.

The details are then given of a series of experiments, illustrating in an ingenious model, by means of an explosive mixture of chlorate of potash, the effects of explosions at different heights within a boiler.

A careful examination of the circumstances, and the results of his experiments, convinced the author that a simple mechanical arrangement, applicable to all boilers, might be introduced, so as to diminish the danger arising from the sudden development of an explosive force. He proposes to connect with the bottom of the boiler, by means of a pipe, an extra safety valve of a given area, loaded to five-sixths of the absolute cohesive force of the boiler plates. In the event of a sudden development of steam, the first shock would act upon the valve and open it, which would have the effect of depriving the wave generated of its destructive force, and at the same time diminish the violence of the second shock from the top of the boiler, having permitted the escape of a portion of the water from the boiler.

[A very interesting discussion followed the reading of the paper, in which a variety of information, of an invaluable nature, as connected with the causes of explosions in different mining and other districts, was detailed by Messrs. Parker, Neward, Dunkin, and others, for the whole of which we shall endeavour to make room in our next.]

ON THE COMPUTATION OF HORSE-POWER.—As many persons may be unacquainted with the method of converting the 8 lbs. of coal per horse-power per hour into the form commonly used in Cornwall, and as clearer ideas are obtained from figures so arranged as to be capable of direct comparison, I have submitted the following, more with a view of calling attention to this part of the subject than of founding any decisive argument thereon. The first difficulty is the present Cornish method of 24 lbs. of coal, taken from the use of the imperial bushel of damp Wenmore coal. At Hordland, doubtless, the Winchester bushel was used. Newcastle coal was taken at 24 lbs. the Winchester bushel; the Welsh coal always employed in Cornwall is heavier. The best performance in pumping was taken at 39,000,000 per 24 lbs. of Welsh coal in 1798. Now, as one horse-power per hour is 1,980,000 lbs. one foot high, 24 lbs. would give 33,262,500 lbs. one foot high, provided the actual and nominal power coincided; but at one-half greater it would become 33,892,500 lbs., and at two-thirds greater—38,775,000 lbs., subject to some variable deductions for pump friction, &c., to reduce the power derived from the effective steam pressure in the duty derived from the weight of water raised.—*Correspondent of Mechanics' Magazine*.

The trains of the Great Western R. Way travel—less than 25,000 miles per week, that is, a greater distance than the circumference of our earth.

ANDREW SMITH'S PATENT WIRE ROPES, for standing rigging, lightning conductors, strapping of blocks, mining, railway, and general purposes; about half the size and weight of hemp ropes, and 25 per cent. cheaper. Testimonials to that effect, with specimens, may be seen, and every information obtained, at the office, 74, Old Broad-street, city, E.C.4, Princes-street, Leicester-square; or, at the office, 12, Gower-street, W.C.1, and also of the following agents:—
 Robertson and Co., 12, Gower-street, W.C.1, Liverpool.
 Matthews Dunn, Newcastle-on-Tyne.
 Joseph Bothway, Wigan.
 John Thompson and Co., Wigan.
 J. T. Trevellick, Wigan.
 Thomas Mooney and Son, Wigan.
 Perrin and Nolan, Wigan.
 Costes and Young, Wigan.
 James Kibbin and Co., Glasgow.
 James Goss, Glasgow.
 J. M. Beattie, Clements-lane, High-street, Dundee.

This rope has been in use for standing rigging in her Majesty's Navy, and in a great number of merchant ships, for upwards of five years, and is giving the highest satisfaction; the rope is also employed in various mines and railways in different parts of the kingdom, but reference is especially made to the Blackwall Railway, where the cable has been most severely tested, for although it has been in use upwards of ten months, and has travelled a distance nearly equal to the circumference of the earth, it is, to all appearance, as good as when first applied.

THE RAILWAY COMPANIES AND IRON MANUFACTURERS—LOSH, WILSON, and BELL, beg to recommend to parties E.M. FLOYD or MANUFACTURING RAILS, their IMPROVED MACHINE for STRAIGHTENING RAILS, in which, by a simple and powerful application of the screw, the rail is rendered perfectly even, without being disfigured by hammer marks.—For terms and description apply to the makers.
 Walker Iron Works, Newcastle, July 28.

NORTH KENT RAILWAY, from Gravesend to Rochester, via the Thames and Medway Canal. Capital £200,000, in shares of £20 each, deposit £2 10s. per share. Prospectuses may be obtained, and applications for shares made at the company's office, No. 42, Lombard-street, London.
 GEORGE WALTER.

PUBLIC COMPANIES.

SHEFFIELD.	
Sheffield and Manchester Railway	Cutlers' Hall, Sheffield Aug. 28 12.
Grimsby Haven Navigation Co.	Great Grimsby 28 12.
Port Gloucester Mills Company	Lombard-street 28 12.
Tuff Vale Railway	Angel Inn, Cardiff 24 1.
Edinburgh and Glasgow Railway	7, North Queen-street, Glasgow 24 1.
Great Western Railway	Merchant Venturers' Hall, Bristol 26 12.
North Midland Railway	Station, Derby 26 1.
Southampton Dock Company	19, Bishopgate-street 26 1.
Bury Port Harbour Company	George and Vulture Tavern 26 12.
Kidwellly & Llanelli Canal Company	George and Vulture Tavern 26 12.
Manchester & Birmingham Railway	York Hotel, Manchester 26 12.
British Iron Company	London Tavern 26 1.
Birmingham & Derby Junction Rwy	Waterloo Rooms, Birmingham 26 1.
West Durham Railway	Office, Darlington 22 1.
St. George Steam-boat Co.	Clarence Dock, Liverpool 27 1.
London and South Western Railway	Office, Nine Elms, Wanshall 28 1.
Trefort Mining Company	6, St. Mildred's court 30 1.
Durham County Coal Company	15, Sun Inn, Darlington 31 12.
General Steam Navigation Co.	60, Lombard-street 31 2.
Nottingham Mining Association	9, Wainford-court 31 11-12.
Portsmouth & Farling Waterworks	George and Vulture 31 10-11.
Kent Water Works	George and Vulture 31 12.
Metropolitan Gas Light & Coke Co	Three Tuns, Tavern 31 12.
Great North of England Railway	Office, Darlington 7 11.

LONDON.	
Cornwall Mining Company	16, Aug. 28, Union Bank.
York & North Midland Railway	14, Regt. 1, Glyn and Co.
Midland Mining Company	16, Regt. 1, Glyn and Co.
Tregilow Mining Company	16, Regt. 1, Glyn and Co.
British Colonial Bank	16, Regt. 1, Glyn and Co.
The Miners' Bank	16, Regt. 1, Glyn and Co.

DIVIDENDS.	
Mining Company of Ireland	15 per cent. Office, Dublin Sept. 1.
London and Westminster Bank	8 per cent. Bank, Lombury 16.

NOTICES TO CORRESPONDENTS.
 "A Subscriber" is informed, that, if the Index to the Journal for 1840 was not duly delivered, it was neglected on the part of the agent through whom he receives the paper; a copy can be had, on application at our office, or will be forwarded, on receipt of an address.

We do not contemplate having any personal communication with "M. U. M." for the next six months. The letter from Hamburg came duly to hand.

THE MINING JOURNAL,

Railway and Commercial Gazette.

LONDON, AUGUST 21, 1841.

The columns of the MINING JOURNAL have, on more than one occasion, done "good service" to the shareholders in Joint-Stock Companies, and one of the latest subjects treated upon has (as we predicted) become subject matter for the Court of Chancery. The case under notice is so recent, that we deem it unnecessary to do more than refer to the "doings" of the "Durham County Coal Company" and its adjunct the "Northern Coal Mining Company," as reported in our columns, with "illustrations" by Mr. MATTHIAS DUNN, which embellished that gentleman's report, and the "leetle" particulars of the busy B's. We are now informed that proceedings have been instituted under the following circumstances, and to a narration of which we must confine ourselves on the present occasion.

It appears, from the information which we have received, that Messrs. ORD, FAITH, the Busy B's—cum multis alius of the late directors, who have either been expelled, or, acting on Mr. Alderman HUMPHREY's principle, have resigned—did accept bills to the tune of some 70,000*l.* on behalf of the company, which were discounted by certain joint-stock banks, and, in consequence of such bills, all, or in part, not being duly paid, the holders very naturally proceeded against the company for the recovery of the amount. As, however, Messrs. ORD, FAITH, and Co., no longer occupied the post of directors, the creditors, as advised, proceeded against the *bona fide* acting directors, who, when they undertook office, did not undertake to pay debts contracted by the defunct board. The consequence, however, is, that proceedings at law have been taken, and the directors have had recourse to the Court of Chancery, with the view of staying such proceedings, by means of injunction, as affects the claims of the holders of the bills, and also by bill, praying that Messrs. ORD, FAITH, and Co., may be called upon to account for, and refund, all monies received from the shareholders, under the plea (as we think, satisfactorily established) that a fraud was committed in the formation of the company; and, further, to annul all contracts entered into by such parties, so far as the company is concerned. Such we believe to be the interesting state of affairs at the present moment.

As the special general meeting of the shareholders of the British Iron Company is convened for the 20th instant, we avail ourselves of the information conveyed to us by the committee of "united shareholders," of placing before our readers some of the leading points and arguments, having for their object the dissolution of the company—at the same time, not pledging ourselves to the correctness of the deductions at which the committee have arrived, although assured that the results are taken from the accounts and reports submitted by the directors.

It is represented to us, that the loss sustained by the company since its formation, up to the period at which the accounts were made up and submitted—in May of the present year—is no less than 924,230*l.*, or an average annual loss, from 1825 to 1841, of

63,616*l.*, in addition to the annual average law expenses, which for the like period has been 12,506*l.*—the interest paid Mr. Attwood 16,250*l.*, added to which interest and discounts, amounting to 19,281*l.*, while the interest on capital paid to the shareholders amounts only to 6*s.* 2*d.* per cent. per annum. The accounts before us further show, that the value of the property, according to the report of the directors, is 1,078,667*l.* 1*s.* 1*d.*, from which has to be deducted the liabilities, amounting to 388,191*l.*—thus leaving an available balance for division amongst the proprietors (assuming the estimates of the directors to be realised) of 690,476*l.* 1*s.* 1*d.*, which, upon 18,839 shares, would give a dividend of 37*l.* per share.

As we are not, however, quite so sanguine as the board of directors or the committee of "united shareholders" of such amount being obtained, we will divide the sum by two, which would give a surplus, after payment of liabilities, of 345,000*l.*, or (say) 18*l.* 10*s.* per share, divisible among the shareholders. On the other hand, assuming that the company continues its operations, without regard to profit or loss, it is quite clear that the sum of 388,000*l.*, or 20*l.* 10*s.* per share, must be raised. The question hence arises, whether it be better to "wind up," and receive 18*l.* per share, or to "go on," and pay 20*l.* per share—making the slight difference of 38*l.* per share to every shareholder—the shares being at present unsaleable. We have recorded the figures as they have been submitted to us; if they be correct, the shareholders must see that the sooner the concern is brought to a close the better. In the meantime, we think it behoves the directors to meet the representations of the committee, if ill-founded, by facts and figures.

The continued, and, we fear, continuous, list of mining accidents, recorded in our columns, calls for more than a passing remark, inasmuch, that the misery entailed on the families of those who are victims to the want of care on the part of proprietors or collieries and the agents, appears to be lost sight of—the only consideration being that of resuming operations and burying the past in oblivion. It is lamentable to reflect on the want of protection and absence of feeling evinced by those who reap their thousands per annum by the hard labour of the operative miner, but who possess not the feelings of humanity which should dictate the formation of a society and the establishment of a fund for the protection and support of the widow and fatherless—bereaved as they are by accidents, too frequent as they are too fatal.

We are induced to revert to the subject, on the present occasion, from the circumstance of the melancholy accident at the Thornley Colliery (in addition to numerous other instances), whereby nine lives were lost. So far as we can learn, the cause of the explosion appears to have been the accumulation of foul air, or, to use a more technical phrase, the neglect on the part of the trapper, having caused "the waste to foul;" a trap-door having been neglected, whereby the foul air which had accumulated was forced towards that point by the movement of the waggons—thus causing it to come in contact with the lighted candle of the trapper, and hence the explosion. In this case, we are told, little damage was done to the mine—the ventilation being restored to its proper course within three hours after the accident; but it must not be lost sight of, that this accident cost nine lives—leaving their families to mourn their loss, while the proprietors escaped with a three hours' detention of their gains.

We have reason to believe, that every attention was paid, and every exertion used, by the agents and others, in extricating the unfortunate sufferers; but, alas! what exertions could restore to the widow and orphan the husband and the father? We have received a letter from a correspondent, touching on this subject, in which he observes:—

"The circumstances of a newly-invented air-crossing made use of in this pit ought not to go unnoticed, by which, I understand, many lives were saved, which, in all probability, would have been sacrificed, had the common stoked, or flat-topped crossings, been erected in this instance. For the construction of this air-crossing, and as well for his indefatigable exertions to save the lives of the sufferers on this lamentable occasion, too much praise cannot be given to Mr. Heckle, the viewer of the colliery. It is to be hoped, when this air-crossing is made known to parties having the management of different collieries, that it will be put in general use, as there can be no doubt of its answering every purpose of an air-crossing, while it holds out, by far, greater safety to the miner than any other now used."

We trust the practical suggestion of our correspondent will not be lost sight of, for if we cannot save all, it is our duty, as far as lies in our power, to do what we can to prevent the occurrence of accidents of this fearful nature.

The day of investigation into the affairs of the Blackwall Railway, and the conduct of its directors, is now past, and the sound of the clarion of Alderman HUMPHREY, M.P., has dwindled down to the squeaking of a penny trumpet. No longer can the Member for Southwark, and Alderman of the City of London, meet his constituents upon the same terms, and with the same confidence, as he once did. He now enters the House of Commons as one whose character, as a mercantile man, is sullied, and carries with him the vote of censure of a body of proprietors who had reposed confidence in him as one on whom devolved the responsibility of the management of their affairs—he stands forward as one who has sacrificed truth in the endeavour to mislead the proprietors by alleged charges against his late co-directors—which allegations he cannot sustain, but, by way of explanation, imputes to the pen a frenzied or excited imagination. It is indeed lamentable when we find a Member of the Imperial Parliament of Great Britain descend to conduct such as has been the subject of animadversion, not only on the part of the constituency (proprietors), whose representative he was, but of the public at large, for, we believe, after the explanation afforded by the hon. member at the meeting held on the 19th inst., there can be no second opinion entertained. We cannot, indeed, suppose, after the proceedings which are this have been perused and commented upon by most commercial men, and which have, moreover, been promulgated throughout the country through the medium of the press, that Mr. Alderman HUMPHREY will retain his aldermanic gown—although we have, certainly, an instance in the case of Alderman Talacre Wood, that it is hard to shame these civic magistrates into a sense of justice or decorum. We trust that a meeting of his constituents will be held—that they will call upon him to afford a better explanation than he did to the proprietors of the Blackwall Railway, or, in its absence, to resign the gown, which should be considered as a mark of distinction for probity and honest dealing, and not to serve as the cloak of hypocrisy or to screen the libeller and convicted jobber. As regards his Borough constituents—those who are represented by the worthy

Alderman in the Legislative Assembly—we would advise them to bring the facts before him—to discuss them, as done by the directors of the Blackwall Railway—to force on that gentleman a quiet resignation, and, as he has shown himself so fond of *Hundred*, to press upon him the acceptance of those of the *Chilterns*.

It is not, however, meet, that we should thus descend on the conduct of Mr. Alderman HUMPHREY, without adducing the grounds on which we arrive at conclusions. Firstly, it is admitted by the honourable member that he sold more shares than he possessed, and that he applied to Mr. CRAWSHAY, a co-director, offering to purchase 100 shares, at 100*l.* above the market price of the day—this fact alone calls for observation. If Mr. Alderman HUMPHREY was only anxious to retire from the direction, and relieve himself from liabilities, by the disposal of his interest, it is quite clear that a purchase of sixty shares, in addition to the forty he held, would have been sufficient for him to have made good the sale he had previously effected of 100 shares; therefore, the application to Mr. CRAWSHAY for the larger number, at once proves that the object of the worthy director was jobbing, and not retiring—at least, such is the impression the explanation leaves on our mind. We do not infer that Mr. Alderman HUMPHREY would have availed himself of the advantage afforded by the fact being made known on the market, that Mr. CRAWSHAY, a director, and the partner of the chairman of the company, was a seller; while it must be, moreover, borne in mind, that the worthy Alderman, who does not understand one word about jobbing in shares (if we give credence to his tale), tells Mr. CRAWSHAY that he "will give him 'the call' for 100 shares more that day month at the same price." Assertions and facts do not go here hand in hand; the Alderman tells us he wishes to withdraw from this sadly-mismanaged undertaking, and that he therefore sells 100 shares, (possessing only forty); but we find, on the statement of Mr. CRAWSHAY, and the admission of Mr. Alderman HUMPHREY, that he not only buys 100 shares, but offers to purchase a second hundred at one month forward at the same price, thus giving evidence of his opinion of a "rise"—in this there can be no mistake. Mr. CRAWSHAY having made his statement, Mr. Ald. Blackball HUMPHREY explains, that his only reason for selling was because he could never have an opportunity again of getting so much money for his shares, while, as we have already shown, he was desirous of purchasing 100 more shares, still retaining his own forty, at 1*l.* per share higher than the market price. Does not this require explanation? In the course of the proceedings, the honourable member, in answer to a question put to him, of whether he was not aware that expenses were incurred in passing a bill through Parliament, which it would be inconvenient to specify in detail? coolly libels his co-legislators, as he had previously done his co-directors (although perhaps with more truth), when he says—"I know a great deal of money to have been laid out in the progress of railway bills, amongst members of both Houses of Parliament." If this be not libellous (although matter of fact) we know not what is. Here is a charge which cannot be passed over by a mere vote of censure.

We did, on the appearance of Mr. Alderman HUMPHREY's letter, attach importance to the charges he preferred against the board of directors, more especially that wherein he declared that many thousands were due from members of that body at the very time of shares being declared forfeited. The sad break down in the endeavour to establish the correctness of the assertion—contrasted with the open and candid explanation afforded by the directors, and, moreover, the resolution passed, and the election of Mr. RENNIE to fill the vacant office occasioned by the retirement of Mr. Alderman HUMPHREY—must convince that gentleman, and directors generally, that there is but one course to pursue, if that they desire to uphold their station in society and to be respected. On this point the words of the resolution convey their own comment:—"That this meeting having heard the explanation of Mr. HUMPHREY with reference to the charges and insinuations made by him against the directors, in a letter published in the *Times* of the 27th of July, and of the answer thereto made by the directors, is of opinion that they are perfectly exculpated from such charges and insinuations."

Such is the position of Mr. Alderman HUMPHREY—disgraced and degraded in the estimation of his fellow-citizens. He may now court the society of Mr. Alderman THOMAS TALACRE WOOD, and say with the dramatist—"Brother, brother, let us shake hands."

The proceedings at the ninth annual meeting of the Royal Cornwall Polytechnic Society, held within the past fortnight, although not possessing so much interest as those which have preceded it, with reference to subjects on which it is more immediately our province to treat, yet has afforded a further evidence of the utility of institutions of this nature, and which must become popular as they become more generally known. It will be our object, in our forthcoming early Numbers, to publish abstracts of the several papers submitted, as also a description of those models which may be of interest to our readers, while we may in the interim advert to the general proceedings, and to the more particular subjects brought under consideration.

We were pleased to find Sir C. LEMON presiding over an institution so well calculated to reflect credit on his useful and meritorious exertions in the advancement of practical knowledge, and whose munificent offer to the miners of Cornwall to establish a School of Mines was rejected, although an introductory class had been supported for two years at his sole expense. It is gratifying to find men in the station of life which the hon. Baronet fills, thus lending their aid for the benefit and advantage of the humble classes, and by their patronage encouraging the application of the mental energies to the development of new resources and improvements in the mechanical as well as the mining world.

In the address of the President, we recognise several important features, which cannot be too strongly impressed on the community at large, among which is the importance to be attached to the powers of the steam engine, to which we are indebted for the mineral resources of this country, and more especially as affects our produce of copper—that metal being previously imported for the purposes of coinage. Another subject treated upon by the worthy President was that of a plan for raising miners, which he regretted (as all must do) had not been either satisfactorily proved, or, if so, had not been adopted at any mine, although 600*l.* had been subscribed towards so desirable an object. This is a matter which must force itself on mine adventurers, as the saving would be theirs, in a pecuniary point of view, while they would give to the miner a lengthened existence, which may be fairly valued at one fourth or one-fifth of a miner's life.

In the course of the proceedings, a paper was read "On the Health of Miners," and we regret to learn, although information had been sought from the agents of the several mines, the communications were of so limited a nature, that the council could make no report of importance on this interesting subject, which has its first claims on humanity, but which we regret to find disregarded in the present instance. Without entering into the details of the paper, we may observe, that the statement with reference to the miners employed in the sulphur mines of Ireland is at least slightly overrated. An interesting paper "On Magnetic Influence in Mineral Deposits," with one "On the Action of Water in Boilers from Gaseous Combinations," will meet with our early attention, as also several papers, by Mr. ROBERT WAKE FOX, the Rev. J. CONYBEARE, and other gentlemen, whose presence gave importance, as well as interest, to the meeting.

PROCEEDINGS OF PUBLIC COMPANIES.

NATIONAL BRAZILIAN MINING ASSOCIATION.

A special general meeting of the proprietors of shares in the above mining company was held at the offices of the company, Throgmorton-street, on Friday, the 20th inst.

JOHN IRVING, Esq., M.P., in the chair.

The SECRETARY (Mr. Mariner) having read the advertisement convening the meeting, the CHAIRMAN rose, and said that the situation of the association rendered it apparent to the directors that it was necessary to call a meeting to give the proprietors an account of the present state of the Brazilian mines. It would have given them the greatest satisfaction not only to have been enabled to state the apparent prosperity of the company, but to declare a dividend. Unfortunately, for many years disappointment had followed disappointment. Their hopes had been high, but the result had not been equal to their expectations—however, all hopes had not yet left them; the report would testify that they had even now a prospect of some return adequate to repay the confidence and liberality which the proprietors had displayed to the directors. They sincerely trusted that their present expectations would be realised, and that the future would not be what the past had been—constant disappointment. He would now request the secretary to read the directors' report, which had been drawn up with the greatest care and the strictest adherence to truth; should they find anything in it liable to misconception, they must set it down as a mistake, for the directors had no doubt as to the accuracy of the statements therein put forth.

The SECRETARY then read the report as follows:—

REPORT.

Previous to submitting the plan which the directors have to propose for carrying on the works at the mines, they beg to make a few remarks on their situation as directors, and on the present state and prospects of the company. The position of the directors has been, and still is, one of extreme singularity and of great difficulty; for, although possessing the mine of Cocoes, celebrated in Brazil for its extraordinary productiveness, and well known in England from the great competition for its obtaining, year has passed after year in one continued succession of disappointments, and the directors, instead of the expected gratification of announcing large dividends, have been forced upon the painful expedient of drawing upon the support and confidence of their fellow-shareholders; but it was not on light grounds that the association first undertook to work the Cocoes Mine—neither has it been without the most anxious consideration, that the directors have from time to time recommended to their fellow-adventurers the prosecution of the enterprise; for, besides the great celebrity of these mines, independent of the well-known fact of the great competition for their acquirement among many of the English mining companies in Brazil, who were most able to obtain correct information on the subject, the directors themselves have instituted, in a variety of quarters, the most searching investigations and inquiries—all of which have been confirmatory of the fact of the former riches of the Cocoes Mines. Why, then, have the hopes and expectations of the directors and shareholders been disappointed? Has it been from the great depth of the mine, which is scarcely probable, for the utmost depth at present worked upon is seventeen fathoms below the water. Has it been from the superior hydraulic machinery of the Brazilians?—This cannot be, as it is well ascertained that no hydraulic power was ever used at the mines before the association took possession. Has it been from the superior facilities the Brazilians possessed of extracting the ore in large quantities?—This cannot be, for their ore was brought to the surface in bowls on the heads of negroes—necessarily in small quantities—whereas the association uses powerful hauling machines, capable of extracting, with great expedition, the largest quantities of ore. How is it, then, with this superiority of science and power, that the hopes and expectations of the directors and shareholders have been disappointed?—A short summary of facts will afford a solution of the problem. These may be briefly comprised under three heads:—

1. The non-examination of the main workings of the Brazilians, previous to the commencement of the company's operations.
2. The prosecution of the company's works without a scientific survey and plan.
3. The immense influx of water, both from accumulation in depth and from surface infiltration.

About two years since it became apparent, from circumstances fully detailed in last report, that the works at Cocoes were proceeding on no fixed principle—were directed to no definite or determined object, and that, instead of a defined plan for the intersection of specific veins, known to run in certain localities and strata, the underground operations had generated into an indiscriminate search for gold in various directions—dependent for success only in the well-known riches of the mines. A survey was, in consequence, commenced by the head mining captain, Mr. T. Treloar, and accurate measurements taken from the head mining works at the surface of the mountain to the lowest levels of the company, and the result was a complete demonstration that there are two principal strata dipping from west to east, and that most of the works of the company had been carried on in the uppermost or eastern stratum, while the greater part of those of the Brazilians had been performed on the deeper or western stratum. It would be superfluous to dwell on the importance of this discovery, and so momentous did it appear to the directors, that they determined to test it by another survey. They, therefore, lost no time in sending out Captain Davies Treloar, whose testimonials, as a mining captain, are of the first order, more particularly as regards his abilities as a scientific mapper and dialler; and his orders were to devote himself, in the first instance, exclusively to a most minute and accurate survey of the Cocoes Mines. Nearly six months were employed in this duty, and, after a variety of measurements, embracing the whole of the Cocoes Mountain, from the surface to the lowest depths, his survey, repeated in October last, agrees, with a very trifling difference, in every point with that of Captain Treloar.

By these surveys the two first causes of failure have become apparent, and the path of future success, cleared of past difficulties, and enlightened by more accurate knowledge, is still open to the association. The third cause of failure consisted in the great and vexatious obstacles presented by the immense influx and accumulation of water; for although the powerful hydraulic machinery erected by the association has proved sufficiently efficacious during the greater part of the year, still, at the end of the dry season, when the surface water is diminished, and consequently the go or lower level of the mine is set in motion, the water, in spite of every contrivance, has been found to rise in the mine—thus interfering with the present works and investigations, and putting an insuperable bar to operations at a greater depth. To overcome this difficulty, and to place the association upon a footing of even still greater economy, by diminishing the expense of the hydraulic machinery, a great work was begun in 1857—being an adit, or tunnel, driven from the foot of the mountain—thus forming a permanent, a safe, and inexpensive method of drainage. The length of the adit has now attained to upwards of 300 feet, and will cut the lode at a few more fathoms. The effect of which is already felt, in that a very great degree, upon the nearer a prospect of the adit to the mine, and as the surface water never fails off materially till the months of August and September, all apprehension may be laid aside of a recurrence of the former vexatious and expensive obstacles from the accumulation of water in the Cocoes Mines.

The mine of Catuba, on the Mocimbas property, is the next subject to which the directors have to refer. It will be in the recollection of the shareholders that this mine consists in an immense lode or mountain of stone, whose productiveness may, with some accuracy, be measured by the quantity of labour bestowed upon it. The bulk of the force employed on this mine was withdrawn to Cocoes at the commencement of the present year, and the mine, being left to the hands of the local labour, and to the local machinery, has been working on a very small scale, and has produced a very small quantity of ore. The directors have never lost sight of this valuable mine, but, by means of a separate force, exclusively devoted to this purpose, have for many years unceasingly pushed on—often by night as well as by day—a work of considerable magnitude, difficulty, and importance. It is an adit, or tunnel, driven for the double purpose of draining the mine, and affording an expedition and cheap exit for the ore. It has been forced almost the whole of the length through solid rock, blasted by gunpowder, and has now reached the lode at a distance of 410 feet, including the open cutting for the tunnel. The width and height of this tunnel are sufficient to admit of the ore being conveyed out of it by means of mule carts. Its depth, from the top of the mountain, is 420 feet, and below the lowest workings 120 feet perpendicular, so that the works may be carried on, free from the annoyance of water and the expense of hydraulic or hauling machinery, for a period which will probably exceed the life of any present shareholder.

In this position of affairs, the directors find themselves with an exhausted treasury and accumulating responsibilities; and the best mode of acting, under these circumstances, for the common good, has been to them a subject of deep and anxious deliberation. It would be painful indeed to give up the Cocoes Mines with their gold veins, and to leave the mines of Catuba and Mocimbas to the hands of the local labour, and to leave the directors with a large debt, and a large liability to the shareholders. It would be painful indeed to see other parties profiting by the ground we have opened—guided by the knowledge we have acquired, and reaping the fruits of our long and anxious toil—lost to us by the denial of a little more money and the exercise of a little more perseverance. The directors have been hitherto supported by the bulk of the shareholders with a liberality and a confidence which have been most gratifying to their feelings; and, in making this public acknowledgment, it would be unjust to omit special mention of the Brazilian shareholders, who have not only been prompt in the payment of the calls on their shares, but have also taken their proportion of the new scrip, and regularly paid the instalments. In so doing, the shareholders will be as happy to secure as the directors are to state, that the Brazilians took the opportunity of expressing their unshaken confidence in the Cocoes Mines, and their willingness to co-operate in any measure that might be requisite for their full exploitation.

The plan which has appeared to the directors the most eligible for adoption under the circumstances aforesaid, is to raise the sum of 25,000*l.* from two years, on loan notes, bearing an interest of 5 per cent. on the sum paid, from the date of the respective payments, and a bonus of 10 per cent. at the expiration of the said term of two years. The plan, however, is subject to the condition that the loan notes to be secured on the entire property of the association in Brazil generally, but especially on the agricultural estate of Catuba (a description of which was given in a late report for its contribution), and also on the mine of Catuba and the produce therefrom; the whole of which (without any deduction for the expenditure) will be realised quarterly, and appropriated, part for the payment of the interest half-yearly, and the remainder reserved in Government securities, for the final liquidation of the principal. During the two years that the Cocoes Mine was partially worked, before the commencement of the tunnel, the average produce was between 500*l.* and 700*l.* per annum; the number of stamping stamps employed for crushing the ore being eighteen, and the force in breaking it thirty men; but, during the progress of the tunnel, the severity of an augmentation in the stamping power to meet the increase of the ore, consequent on the greater facility of extraction, has not been lost sight of, and the directors have the pleasure to add, that they have now sixteen stamps erected and paid for at Catuba, adapted for working forty-eight heads instead of the eighteen formerly employed. A large increase of produce must, therefore, necessarily take place from this additional mechanical power; and in order to make the most of this fortunate prospect, the directors have and intend to place upon the mine of Catuba a new and improved set of stamps, being a sufficient force to crush the stamps by night as well as by day, thereby doubling the time of the working, and consequently the produce. The sum will be divided, as in the practice in most of the mines in England, into three portions,

each man working eight hours per day; instead, therefore, of thirty men being employed in breaking the ore as formerly, the tunnel will afford the capability of placing advantageously 200 men almost immediately, and these will hereafter be increased, together with an additional stamping power, to as great an extent as can be profitably employed. The inference is, that by the application of the additional force and power, a produce nearly equal to six times the amount of that which has been heretofore raised may be calculated upon, yielding a revenue of about 35,000*l.* per year. It is as very satisfactory to be able to state, that the ore at the depth of the tunnel is richer than that which has hitherto been taken from the top of the mountain, and that the mine is quite independent of any impediment from rain or drought, for the tunnel has put all the ore over and over, and the stamps are worked by a river capable of moving a steam power of indefinite magnitude.

It fortunately happens, at this epoch, that the advance of the tunnel at Cocoes will enable the superintendent to spare a large force for Catuba, without cramping the operations at the Cocoes Mine; and it is very gratifying to the directors to be able to state, that the completion of these great works, together with the assistance they obtain from their farm on the Botu estate, will enable them to work the two mines—one the speculative and the other the certain—for the moderate sum of about 600*l.* or 700*l.* per annum, including all expenses both at home and abroad.

The directors propose that the payments of the loan shall be made in four instalments, with an interval of three months between each—viz., on the 15th Sept. 25*l.* per cent.; 15th Dec. 25*l.* ditto; 15th March 25*l.* ditto; 15th June 25*l.* ditto, and that bonds, signed by the directors, of the tenor above described, be delivered on the payment of the first instalment. The bonds will be from 250*l.* to 1,000*l.*, for the accommodation of the takers, and interest, at the rate of 5 per cent., will be allowed from the 1st July last, on bonds paid up in full.

The subscription of this sum will enable the directors to prosecute the present works to their full development. Guided by a long experience, past errors will be avoided—enlightened by a better knowledge, future results may be obtained, consistent with the high character and corresponding with the universal opinion of the riches of the Cocoes Mines. The directors, therefore, confidently expect, from the wealth and respectability of their shareholders, that they will come forward for the protection of their own and the common interest. No sacrifice is required—the sum to be advanced is not large—the security is undeniable, and the advantages as great as can be reasonably expected for the short period that the money will be advanced.

In alluding to that interesting portion of the establishment, the black population, the directors have great pleasure in bearing witness to their good conduct, and their progressive improvement in the different branches of industry to which their energies are directed, and, as a proof of the attention that has been devoted to their moral improvement, and the comforts of life which they enjoy, the population has increased in a ratio of 21 per cent.

In submitting this proposal to their fellow-adventurers—in making this appeal for their further support and confidence, it is almost superfluous to state, that the directors have no interest beyond the promotion of the common good; their office has been one of great anxiety, often of pecuniary advance, and of great personal responsibility; their emoluments have been nothing, for they have not taken a farthing of salary, nor do they intend to do so until the payment of a dividend; and which no effort on their part will be wanting to realise.

Mr. DUBBERKEN had a few remarks to make, and also a motion to submit to the meeting. His brother shareholders had heard the report read—a report which carried truth with it; the directors had therein laid before the proprietors the whole state of their affairs, and the question then before the meeting was, whether they would dissolve the company, or render their support to those directors in whom they had, and justly, he must observe, such confidence? He was going to make a motion, and would state the substance of it at once—"That the report now be approved and adopted, and that this meeting pledges itself to assist the directors in every way in their power, in carrying out the plans therein proposed." He had been much among the Brazilian mines, and could say that at the time this company purchased the mine of Cocoes there were many endeavouring to obtain it; he knew one party who offered 100,000*l.* for it. The Cocoes gold, at the time he spoke of, could be bought at every public-house in the Brazil, it was so well known. He, therefore, submitted to the meeting that it was altogether contrary to geology that the gold should entirely cease with the depth of the mine, as it was well known that the deeper the mine was worked the richer became the ore. He would explain the reason why they had not been rich and made fortunes like the former proprietors; the fact was, the English miners were too proud to take a lesson from the Brazilians, who were used to work gold mines. They (the English) worked the Brazilian mines as if they were tin, copper, or even as coal mines. There was a species of instinct in a Brazilian in searching for gold, just the same as a dog finding truffles. In these mines the Brazilians pointed west, and they had gone east, they lay the whole mistake, all the old Brazilian workings lay at the west, it was from that point that they must expect to get the gold that was to repay them for all the money and anxiety that the mines had cost them. They had a property in Cocoes that they could work at for years; it was a solid rock that 100 years would not exhaust; the report stated that there were forty-eight stamps—it would supply three times forty-eight stamps. They had not only the mines, but a farm that supplied the miners with provisions, and even the neighbouring towns. They had plenty of ground, they had only as yet used one square of the chess-board, all that it wanted was a fair chance. In the mine all that they had to do was to go on where the Brazilians left off, and there was no doubt but that they would meet a very handsome return. By some slip, or other cause, the Brazilians suddenly saw the end of the rich lode, which, for want of skill, they could not again hit upon, and they (the company) had, instead of going west searching for their lode, gone east—exactly in the contrary direction; the directors were now going the right way, from which he expected the happiest results. He could not conclude without informing the proprietors that the directors had never taken a single farthing of remuneration for their unwearied exertions in the management of the mines; the proprietors need not fear trusting the directors with their money, for so truly economical were they in the management, that even the house they were now in, from its being so well let off, only cost them 10*l.* per annum for rent and taxes; there was no lavish expenditure, economy was the order of the day.

Mr. J. MORAN stated, that, as the representative of the Brazilian shareholders, he begged leave to second the motion; he had been some years on the company's property, but, after the hon. proprietor's lucid statement, it would be superfluous for him to say more, than that his experience warranted him in confirming Mr. Debercken's statements.

Mr. OXFORD (the managing director) stated, that, notwithstanding the 1000 contingencies that had prevented their success, he had still in his mind's eye seen the gold of Cocoes; he could not help expressing his certainty as to the fact of the riches of that mine. Their mistake had been, they had worked at the wrong point; now that they had hit the right place, the harvest was soon to follow; a plain proof that they had missed the rich points of the former fortunate possessors was, that they had not got even the gleanings. He had now a little advice for the shareholders, which was, not to be in a hurry to sell their shares, for it was a fact in gold mining, that gold veins never appear singly but in number, when they do make their appearance.

Mr. S. WADE was surprised that the men were drawn from Cocoes—a certainty, to work at an uncertainty.—Mr. OXFORD explained, that the reason of their being withdrawn was the increase in the quantity of water, which prevented them from developing the capabilities of the mine, but now that difficulty was done away with by the tunnel which had been driven, as stated in the report.—Mr. S. WADE remarked, that the directors had said that they had made a mistake, that ought never to have happened, but he was glad they were now going on in the right manner.

Mr. OXFORD replied, that it was not at all unusual for mistakes to be made in mining. He would allude to one mine, now the richest mine in Cornwall—the Trevelyan Mine, the shares in which were now at 240*l.* The "outlet" people in England in mining matters were there mistaken—the Foxes, the Davies's, &c. That mine was not abandoned without the best surveying, but it was abandoned, and the present company bought it, and shortly after found the lode the first company lost, and which now yields the riches.

Mr. NATHAN begged to observe, that, though not a shareholder, and only present at this meeting to be enabled to tell his sons in the Brazil how the gold company's are getting on in England, still he felt that he must state what he knew of the companies mine of Cocoes. He had been twenty years in Brazil, and lived seven years on the company's property, and could distinctly state, that the Cocoes Mine had yielded an abundance of gold. He had bought it long before the mine came into the possession of the present company; it must be from some mismanagement that it did not yield a handsome return now—one thing was certain, the present company had not half force enough upon it.

Mr. OXFORD knew the mine well; they had worked north, south, and east, but not at the point where all the old and fortunate proprietors worked—at the west.

Mr. LAWLESS was aware that they had now cut the footwall of the lode, and that they were making three risings to cut the lode. He then made some remarks as to the state of the mine and finance, and concluded with some remarks upon the scrip shares.

Mr. WADE wished to know if there was any difference between the marked and unmarked shares?—The CHAIRMAN replied, that the matter had not been taken into consideration, so that he could not at present give any answer.—Mr. WADE therefore moved an amendment,

that the meeting be adjourned until the chairman could answer the question proposed; but his motion not being seconded, it fell to the ground.—The CHAIRMAN then put the original motion, that the report be received and adopted, &c., which was carried.—It was then moved, seconded, and carried, that the report be printed and circulated amongst the proprietors.

It was then moved, seconded, and carried unanimously, that the thanks of this meeting were due to the chairman and directors, for their zeal and attention to the interests of the company.—The CHAIRMAN having returned thanks, the meeting separated, all the proprietors expressing their confidence in the directors, and willingness to assist all their endeavours to promote the interest of the company.

REDMOOR CONSOLIDATED MINING COMPANY.

A special general meeting of the proprietors of the new shares in the above company was held at the George and Vulture Tavern, on Tuesday, the 17th inst.

P. STAINBURY, Esq., in the chair.

The advertisement calling the meeting having been read, the CHAIRMAN said that Mr. Henwood had been requested to visit the mine, in company with Mr. Johnson, but Mr. Henwood having been engaged at Treleigh, in Kerry, on a trial, was unfortunately prevented. They therefore met at Penzance, and Mr. Johnson had communicated the principal points necessary to learn the nature of the property, leaving Mr. Henwood to make such observations as he thought fit, on these and any others he might notice. Mr. Henwood accordingly had sent in his report, dated Callington, August 14.—The report was then read, which was very long, and of which we have not been able, as yet, to obtain a copy, but hope to do so in time for our next week's Journal.]

After the report had been submitted, Mr. WALSH observed, that much importance seemed to be attached to that portion of the mine which had been abandoned. How was it that the working was stopped?—The CHAIRMAN stated, that that portion of the mine was abandoned according to the resolution of a general meeting. The directors' opinion was always in favour of its continuance, but they laboured under great difficulties; the pumping was managed by flat-roads, which were of great length, and always breaking—there were above 200 fathoms of flat-roads. The engine was situated at the northern mine, and it was determined to prosecute the discoveries in that part first, abandoning Johnson's shaft for the present.

The CHAIRMAN then put some questions to Mr. John Goldsworthy, one of the pitmen, who, happening to be in London on private matters, had been requested to attend this meeting, to answer any questions that might be required.—Mr. GOLDSWORTHY stated that he remembered the early levels of the Holmbush Mine; they got a little ore from the twenty fathom level, but it did not continue long to yield anything; they also got ore at the thirty and forty fathom levels; the twenty fathom level, in Holmbush, was at least twenty fathoms lower than their twenty fathom level—they being on high ground; the kilias, or ground as it was termed, was as near as possible the same as in Holmbush at the sixty fathom level.

A long conversation ensued as to the prospects of the mine, and the purposes to which the additional capital was to be applied, after which the following resolutions were put by the chairman, and unanimously carried:—"That the managers be authorised to call for payment of the remaining sum of 1*l.* per share of the additional capital, by such instalments as they may deem expedient."—"That the managers be requested to carry into effect the recommendation of Messrs. Johnson and Henwood, for driving the level to Hay Valley, on the silver-lead lode, and to follow the advice of the latter of these gentlemen, as to the future management of the mine, and that the agents be instructed to prosecute the operations with full vigour."—The business being completed the meeting separated.

LONDON GRAND JUNCTION RAILWAY.

The half-yearly general meeting of the proprietors in the above undertaking was held at the offices of the company, 68, Cheapside, on Wednesday, the 16th inst.

THOMAS EDWARDS, Esq., in the chair.

The advertisement calling the meeting having been read, and the common seal of the company affixed to the register of the proprietors, the SECRETARY read the following report of the directors:—

REPORT.

Nothing having arisen since the last general meeting, tending to the resuscitation of this undertaking, the directors have only to submit to the proprietors the following statement of receipts and expenditure of the company during the last half-year:

Receipts and disbursements for the half-year.	
Balance	£414 8 0
Cash received for interest and deposit account	5 6 11
By cash on two calls	418 16 4
Total	£838 10 11
Advertisements, 15 <i>l.</i> 6 <i>s.</i> 6 <i>d.</i> ; petty cash, 3 <i>l.</i> ; printing and newspapers, 2 <i>l.</i> 6 <i>s.</i> 6 <i>d.</i> ; rent, half year, 15 <i>l.</i> ; secretary's salary half-year, 25 <i>l.</i> 6 <i>s.</i> 6 <i>d.</i> ; interest to Brewster's Company, 100 <i>l.</i> 13 <i>s.</i> 6 <i>d.</i> ; interest to Messrs. Johnson and Henwood, 400 <i>l.</i> 0 <i>s.</i> 0 <i>d.</i> ; By balance	834 10 7
Total	£838 10 11

In reply to several questions from Mr. Edges (a proprietor), the CHAIRMAN stated, that the reason of the low expenses having been so heavy, was that they had sued several of the shareholders who had not paid their calls. They had gained the verdict, and they had applied to the twelve judges for a writ of error, the consequence of which was an order for a new trial, both parties paying their own costs, which were heavy. The interest to the Brewster's Company was due in November last, but was not paid until this half year; it was the intention of the directors not to pay them any more interest, as they thought that they had drawn quite enough of the company's money. With respect to the sale and disposal of land, their agreement with the landowners was to the effect, that if the railway was not carried on the land reverted to them; the time expired in June, 1849, the deposits, amounting to about 15,000*l.*, being forfeited, in consequence of the non-fulfilment of the agreement. He could not enter into any statement as to their affairs with the Brewster's Company, as the directors intended to resist any further claim that company might make against them.—It was then moved, seconded, and carried unanimously, that the report be received and adopted.

The CHAIRMAN then stated, that it was only due to the solicitor that the meeting should know he had not charged anything for carrying on the business of the company, excepting actual money out of pocket.

A PROPRIETOR wished to know the number of shares registered?—The SECRETARY replied 3369, of which 7695 had paid the full amount, 1510 had been forfeited, and 245 remained unpaid. They expected to be able to get hold of the party who held the principal part of the unpaid shares, when they would proceed against him for the amount; 10 of the remainder would be paid shortly.—The thanks of the meeting were then voted to the chairman and directors, and the meeting adjourned.

LONDON AND BLACKWALL RAILWAY.

The tenth half-yearly general meeting of the proprietors in the above undertaking was held at the London Tavern, on Thursday, the 19th inst.

WILLIAM HUGHES, Esq., in the chair.

The CHAIRMAN commenced the business of the day by stating that the meeting had been convened in the usual way, and that he should request the secretary to read the directors' report; but, before taking that into consideration, he would recommend that they should proceed with that business which, from the insurrection and association thrown out against the directors, by one of its late members, must be of great interest to the shareholders.—The directors' report was then read.

REPORT.

The report stated that the whole works were in a most efficient working condition, and that the adoption of the wire rope had been attended with complete success; it had never broken, although some portions had been in use for twelve months. In working the whole line with wire rope, there had been no occasion necessary in watching the effects produced upon it, and the engineers had thought that it should proceed gradually; but they were satisfied that the wire rope being rope will be wholly removed from the line, except so far as a spare portion may be required to attend the necessary machinery in starting the train. When this is accomplished, a great reduction in the annual expenditure, as compared with the heavy rope, will be effected. The association for the formation of a company for running steam boats between the termini of the railway at Blackwall and Greenwich, in the establishment of which the directors had taken the greatest interest, had been successfully prosecuted in the proceedings. There was some correspondence for this purpose, the Directors, the Admiralty, and the Government, the highest character for seamanship and speed; in the last year, almost during the greater part of which time only two of the boats were running.

ORIGINAL CORRESPONDENCE.

BRITISH AND FOREIGN MINES.

TO THE EDITOR OF THE MINING JOURNAL.

SIR,—Being the holder of many shares in various English copper mines, my attention has been attracted to the list of sales of copper ore, published in your Journal, and I have been struck by the discrepancy between the amount returned from the sale of foreign ore, and the sale of that which is the produce of our native mines. Pray, Sir, inform me why the Government, in its legislative wisdom, has thought proper to exempt foreign copper from a duty? Is not the ore of our own mines, worked by British industry, as worthy of a protective duty as another produce of our fruitful island? The immense quantity of foreign copper must depreciate the value of our own. The anxiety you have always evinced for the well-doing of the English mines, and the power you possess, through your influential and widely-circulated Journal, induces me to put out the above to you, and to beg that you will call public attention to these facts, in order to work an amelioration for the British miner.

I am, Sir, your obedient servant,

July 31.

AN OLD SUBSCRIBER.

[The importance of the question touched upon by our correspondent requires more than a note. We have, on frequent occasions, observed upon the subject, and shall, on an early opportunity, further advert to it. We may observe that, since the "Miners' Company" have been in operation, the ores produced from several mines (Carn Breca and others) have been withdrawn from public ticketing. Will an "Old Subscriber" submit his own views through the medium of our columns?]

WORKING MINERS' PAY—SMALL CHANGE.

SIR,—As whatever relates to the well-being of the working miner must have an ultimate bearing on the adventures and the mine itself, I am induced to bring before the mining public a subject which has often occupied my thoughts. It is well known that in the provinces we have a *M. paper currency*—that adventurers are in the habit of keeping accounts with bankers in respect of mines—and that the money changers are glad to keep their notes in circulation, they being a source of private profit, as well as a great public convenience, through the conversion of fixed property into a circulating medium. From 50*l.* to 100*l.*, more or less, are generally taken to a mine on pay-days in hard cash—say, one-third—but this is nearly all paid to the grassmen. Pairs of trowsers and trousers, who receive 10*l.*, 20*l.*, or 30*l.*, more or less, as the "luck" may be, are composed of several individuals, each of whom requires his proportionate or agreed-for share. The bank being distant—say from Gernap to Truro—hardly any change is to be had, except at some common pot-house, now usually styled a *debrary* (perhaps kept by the mine agent or his friends). Habits of debauchery are thus formed through regular resort.

"Habits are soon acquired, but when we strive

to strip them off, 'tis long they stay!"

When the monthly score, without double chalk, is paid, it often happens that but little is left for the poor miner and his family, whose physical stamina is thus broken down for want of proper diet and clothing. The fact of the change being always found at the alehouse, is a proof where the earnings go—perhaps, before the silver is ever carried to the mine. Having no other means to get change is another miners' tax. Some remedy is wanted, especially as some Simon Pures, "clothed in purple and fine linen, and faring sumptuously every day," seem to care but little for the working poor. The old mine agents had a fellow-feeling in this respect.

I am, Sir, your's, &c.,

A MINE ADVENTURER.

[There is much truth in the observations of our correspondent, a "change" should take place in the system, and while it is of comparative insignificance to the adventurer it will be no "small change" to the miner.]

INCREASING THE STRENGTH OF WROUGHT-IRON AND STEEL.

BY WALTER R. JOHNSON, PHILADELPHIA.

[We have received the following particulars of the invention of Mr. Johnson from a correspondent.]

This invention the patentee states in his specification to be the imparting strength to wrought or malleable articles of iron and steel, by means of a process called "thermo-tension," of which the following is a full and exact description. The process is founded on the principle that the strength of the materials is increased by means of mechanical stretching, or straining, at a high temperature. Mr. Johnson states—"I first determine in the usual manner, by trial and calculation, what strain might, at the ordinary temperature of the air, and before any improvement has been applied to it, be sufficient to break the particular piece of metal, or manufactured article, intended to be improved by the process of thermo-tension. I then, by means of any suitable apparatus for applying heat and measuring temperature, subject the piece or article to be strengthened to a temperature not exceeding 700 degrees Fahrenheit, preferring that of 550 degrees for most kinds of iron, not restricting myself, however, to the same temperature for all kinds of iron and steel, but varying to a higher or lower temperature, according as the same shall be found most serviceable for the particular kind which is undergoing the process. When the proper temperature has been attained, I apply, by means of any suitable apparatus for applying and measuring mechanical strain, a force equal, or nearly so, to the calculated strength of the specimen or article under process, and continue to apply the same as long as the metal continues to be stretched by it. I contemplate the application of the improvement and process above described, herein called the process of thermo-tension, to the metals, wrought or malleable iron and steel of whatever form in which an increase of direct cohesion may be found useful, whether the same have been manufactured by rolling, hammering, drawing, or by any other process, as I do not confine my improvement to any particular form of materials, or of articles manufactured therefrom."

What Mr. Johnson claims as his improvement in the art of manufacturing iron and steel, and of articles formed therefrom, is the submitting of them, while at high temperature, to mechanical stretching, or straining, as above specified, for the useful purpose of increasing their direct cohesion, by whatever means the necessary force shall be applied, and measured, or the requisite temperature communicated and regulated.

ELECTRO-MAGNETIC LOCOMOTIVES.

We have, from time to time, noticed the attempts making in Germany by M. Wagner and others, to render electric magnetism available as a moving power. In a recent German publication, we find the following account of a locomotive engine on that principle, which is said to have been constructed at Leipzig, by M. Sinner. The experiments are not yet completed, but he has nevertheless, if we may believe the accounts, succeeded in making a locomotive, which will have sufficient power to propel three loaded carriages on the railway from Leipzig to Dresden. According to M. Sinner's calculations, his engine will cost from 1400 to 1600 Prussian crowns, whereas a steam locomotive costs 10,000. The expense of working an electro-magnetic engine of seven horse-power, it is said, will be only 3*l.* 7*s.* 6*d.* per day. The plan on which he proceeds is that of M. Jacob, of St. Petersburg. M. Sinner says his machine produces a rotary motion, which may be regulated with great ease. His largest model consists of twelve bars of iron placed perpendicularly in a circle at regular intervals. In the inside, and in a smaller circle, are fixed twelve other bars on a board, which moves on a vertical line, traced by the centre of the two circles. These two sets of bars are of iron, of which each one is forty inches long, are surrounded by insulated brass wire. The ends of the wire are connected with the poles of a galvanic battery on Professor Daniell's construction. The effect of the battery is to render the bars magnetic, in such a manner that the rows of bars always present one north pole and one south pole. The movable bars are placed on the board between the two fixed bars, so that each north pole of the movable bar is placed between a north and a south pole of the fixed bars, but none near to the north pole. The north poles repel each other, while the north and south poles are mutually attracted. By this means, the board begins to move, but this motion would stop as soon as the attracting poles had approached each other, were not this prevented by means of an electro-magnetism called a commutator. The movement of the machine itself changes the poles of the bars at the exact moment, so that they are always repulsively in the same position as at first—that is to say, there are always two similar and two dissimilar poles opposite to each other, to make the board to move. This effect is continuously renewed. From the preceding description of M. Sinner's electro-magnetic locomotive, which we have translated from the foreign Journal, it does not appear to differ much from those which have been previously tried, and have failed to prosper. The German Journalist is, however, sanguine of its success. We have previously expressed our opinion, that before any practical use can be made of electro-magnetism as a moving power, some means must be found to retard the sphere of the electro-magnetic attraction, which dissolves with distance at a ratio far exceeding that of ordinary magnets.—*Londoner's Advocate.*

A METHOD OF PREVENTING THE OXIDATION OF IRON.

BY M. P. L. ALLAMAND.

This composition, of a metallic nature, preserves iron and steel from oxidizing, by insulating itself into their pores, without altering, in any degree, their surface, or leaving the least roughness on the articles to which it is applied; thus, to white goods, comprising razors, fire irons, &c., the composition may be applied without injuring their "temper"—and the use of them is, in some degree, facilitated after having received this metallic application. It gives to plain or worked articles a whiteness superior to that of platina, and preserves, after the application, all the marks, hieroglyphics, figures, letters, or other engravings, which previously were apparent upon them.

Pure Malacca pewter	120
Silver in raspings	4
Yellow tin	12
Purified bismuth	12
Iron filings	12
Regulus of antimony	4
Salts of soda	4
Salts of potash	1

TO PURIFY THE METALS.

The pewter must be melted eighteen separate times; each melting to be submitted about twenty minutes to the action of caloric, and the impurities which arise to the surface of the crucible should be carefully removed—then throw it into an infusion of "camomile" and "persicaria" (the herb) in equal portions. The bismuth, regulus of antimony, and zinc, should also be melted separately, but only twice, and cooled in an ingot mould with great attention, so that the heterogeneous matter remains in the bottom of the crucible. The tin does not require purifying.

TO MIX THE DIFFERENT INGREDIENTS.

The copper is the first article to be melted—then add the silver in small quantities, and, after some minutes, the tin, bismuth, and zinc, one following the other; as soon as it is apparent by the fumes that the mixture is completed, throw in the two salts together, letting them fuse with vigour, and assisting the alliance of the materials by stirring the mixture with an iron rod; it is then to be skimmed with care, and, by pouring it out, will serve for the metallic application.

METHOD OF EFFECTING THE APPLICATION.

Before dipping the piece of iron or steel in the recipient in which is the metallic mass, already melted, it is necessary to rub the surface strongly with a composition of sal ammoniac and cream of tartar, in the proportion of 5-10 of tartar to the ammoniac; then dip the said piece in the recipient, not leaving it in more than a few instants, and just as long as it is seen to be covered with a certain quantity of matter; on withdrawing it, let it be deposited in a box of wood, of the shape of the piece, and in which a small quantity of the mixture of sal ammoniac and cream of tartar has been placed; then, with a handful of tow, again rub it, throwing a small quantity of that powder upon the surface. By this operation the iron loses its colour and takes that of the silver. That done, the piece is to be plunged again into the metallic mixture for a few instants, when, on withdrawing, it is to be again rubbed briskly with the tow to carry off the superfluous matter. The piece being perfectly clean and smooth, it is to be plunged into a basin of cold water, with which has been mixed a bottle of spirits of wine, of forty degrees of strength, in the proportion of 1 per cent.; after having withdrawn it from the water, and dried it carefully with a linen cloth, it must be rubbed carefully with very fine damped sand, to get rid of the whole of the smoke. Lastly, it is to be rubbed a second time with dry sand, then with a linen cloth, and to finish with a leather. After these operations, which require great quickness, the iron is preserved from the stains of oxygen, and, if care is taken of it, retains all its whiteness.

MINERALOGICAL FEATURES OF THE UNITED STATES.

There is a great variety of useful minerals distributed through different parts of the States—coal may be mentioned among the first; it exists through all the country, lying north of a line drawn from Philadelphia to the mouth of the Ohio, and is particularly abundant on the upper waters of the Susquehanna, as well as on the Allegheny and the Monongahela. At Pittsburgh there is a hill principally composed of coal, and it is found at many places in this district within a few feet of the surface. There are extensive coal mines also on the Rappahannock and Appomattox, in Virginia.

The country on the Ohio is particularly rich in mineral productions. The whole district is bottomed on limestone, on which rests the wide and valuable coal formation mentioned above, extending from the head waters of the Ohio, in Pennsylvania, to the river Tombigbee. Iron ore is found abundantly in the same district, principally towards the upper part of the Ohio; but ore is found in the valleys of the Allegheny chain, and various kinds of ores, of the same metal, are met with in the New England States; at one place carbonate of iron is found, which, on being reduced, produces steel, and is called steel ore. Black lead, in beds of from five to six feet wide, traverses the States of New York, Jersey, Virginia, Carolina, &c. Copper ore is found in Virginia, in Connecticut, and in New Jersey; it exists also in the neighbourhood of the lakes, and a piece of pure malleable copper, weighing 3 lbs., was found in Illinois. Gold mines have been traced extending through a large tract of country in the western parts of Virginia, North and South Carolina, and Georgia; they are wrought to a very considerable extent; the miners, who are people of all countries, say that the produce is richer than that of any other mines on the globe; one piece of pure gold was found weighing 20 lbs. The annual produce is about one million sterling; but we have not heard what proportion of this is expended in the work, or what actual profit has been realized. One singular fact is remarked concerning these mines, which is, the indubitable evidences found that they have been wrought at some period before America was known to the Europeans. Many pieces of machinery which were used for this purpose have been discovered in the workings, among which were several crucibles of earthenware, which are far better than those now in use.

Silver and its ores are not of frequent or extensive occurrence. Mercury has been found native in Kentucky, but it occurs plentifully in the ore as bituminous cinnabar, through the Ohio and Michigan territory. It is found in the soil as a black or red sand, sometimes as a fine red powder, and at other times in iron clay. There are lead mines of vast extent on the Missouri; they are said to occupy a surface of 600 miles in length, and 200 in breadth.

MANUFACTURES OF ANCIENT ITALY.—Imperial luxury could not be fed by the natural resources of Italy, nor by the skill of its inhabitants. The soil, indeed, besides those articles of agricultural produce which have been above described, supplied some of the less important materials which are still derived from it; such as sulphur, saffron, and the iron of the mines in Lombardy. For using the native woods as well as the finer varieties from foreign lands, large manufactories were established in all parts of the country; there were also considerable iron works, chiefly in the north; and the branches of skilled industry required for the consumption of life sustained themselves at the height they had already reached in other nations, but did not gain a single step. The results of the useful arts, in a few of the most durable materials, are exemplified in many ancient specimens of ancient furniture and utensils; and the most instructive fact derived from inspecting such relics is, the great difference between the ornamental articles and those which are merely useful. In the former, designed for the rich, the almost mechanical dexterity is displayed; in the latter, which were to be sold to the poor, or, at all events, to be kept out of sight, everything is coarse, clumsy, and ill finished. Beautiful lamps, braziers, and vases, are to be found without number; but a well-made hinge, a neat lock and key, or an accurately fitted handle, are things quite unknown. These manufactures flourished most where they were connected with the fine arts; and these, chiefly in the hands of foreigners; so directors, if not so workmen, spread out in an infinite variety of departments. But, with all these aids, many articles of every day use were still drawn from distant shores, and commerce necessarily extended itself.—*Edinburgh Cabinet Library: Italy and the Italian Islands.*

THE TUNNEL.—The shaft of the Thames Tunnel on the Wapping side of the river, in which the circular staircase is to be formed for foot passengers, has now almost entirely disappeared, and not more than five feet of it appears above the ground. A month ago it was at a level with the top of the adjoining houses, and its gradual sinking on the earth below is accounted, has excited the surprise of the inhabitants. In depth it is sixty feet; and it will be about fifteen feet higher, and again sink. When the engineer of the tunnel (Mr. Isambard Brunel) and three other gentlemen passed under the delivery connecting the shaft with the tunnel, many scenes have passed from one above to the other by the same means. The completion of this stupendous work is close at hand.

NEW PROPELLERS.—Several engineers and other scientific men met on board the *Swiftsure* steam-boat, on Wednesday last, to witness experiments with a newly-invented submarine propeller. The patent is intended as an improvement upon the Archimedes screw, having all the advantages without the disadvantages of the latter invention. The trials of the submarine propeller have been made in a small boat of three tons burden, and with an engine of 3-horse power, and they have hitherto been perfectly successful. In order to try the question whether the submarine propeller can be applied on a large scale, the *Swiftsure* has been bought by the patentees, and will be fitted up with the patent moving power; the most sanguine expectations are entertained as to the result.

WORKMANLY INVENTION.—A letter from Munich informs us, that the celebrated Bavarian sculptor, Stieglmayer, has brought to such a pitch of perfection his galvano-plastic process, that its effects would be deemed fabulous were they not publicly exhibited in the museum of the Society of Arts. In the space of two or three hours colossal statues in plaster are covered with a coat of copper, which takes with the greatest accuracy the most minute and delicate touches, giving the whole all the appearance and solidity of the finest casts in bronze. M. Stieglmayer has also applied his process to the smallest objects, as flowers, plants, and even insects, bringing them out with such accuracy, that they seem to have been executed by the hands of the most skilful artists.

RAILROADS.—To improve communications is to labour for real, positive, and practical liberty; it is to make all the members of the human family participate in the faculty of traversing and cultivating the earth—their patrimony; to extend the franchises of the majority as widely and as well as it is possible by laws of election. Improved communications reduce the intervals not only from point to point, but from class to class. Where the rich and powerful alone can travel, where the poor man can only pass from village to village with pain and difficulty, the word equality is a lie. In India and China, in the Mohammedan countries, in Spain, and America, it is of little consequence whether the Government call itself a republic, a despotism, or a limited monarchy. For these reasons I should with difficulty give credit to the charge of tyranny against a Government strongly intent upon the improvement of its communications. Ideas circulate with merchandise along the road and the canal, and the commercial traveller may be considered the missionary. The men of *retrograde* convictions know this well; they dread an engineer more than an editor of *Voltaire*. It being incontestable that one of the first railroads on the continent was established in the Austrian provinces, as that Government has opened five roads throughout its possessions, and encourages steam navigation on the Danube, I venture to conclude that M. Metternich deserves a better reputation than that which he enjoys on this side of the Rhine.—*Michel Chevalier.*

PRICES OF MATERIALS IN CORNWALL.

AS SUPPLIED AT THE PRINCIPAL MINES IN THE FOLLOWING MONTHS.

	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860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